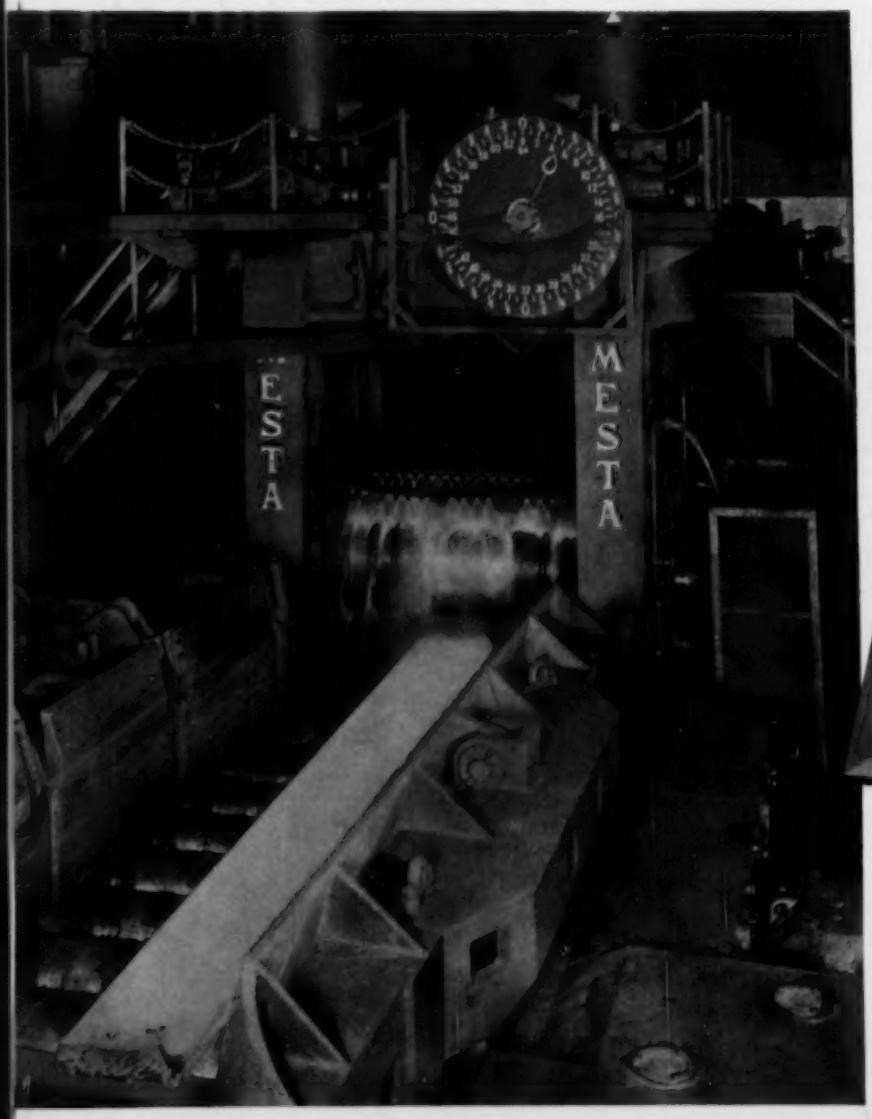
the Iron Age

A Chilton Publication

THE NATIONAL METALWORKING WEEKLY • JUNE 23, 1955

Do we need more steel capacity?
See page 53



SLABBING - BLOOMING MILLS

Designed and Built by MESTA

for SOUTH AFRICAN IRON AND STEEL INDUSTRIAL CORPORATION, LTD.

Designers and Builders of Complete Steel Plants

MESTA MACHINE COMPANY

PITTSBURGH, PENNSYLVANIA

THE STEEL THAT CHANGED A FAMOUS AMERICAN EXPRESSION

GET THE LEAD ~~OUT~~ IN !

● Top management's most pressing problem today is quantity production of quality work at highly competitive prices. The answer to this problem is productivity.

Many manufacturers are turning to Copperweld Aristoloy Leaded Steel, "the steel with built-in productivity," to produce quality in quantity.

Ledloy* gives freer machining, faster feeds and speeds and longer tool life.

Ledloy cuts clean for finer finish—often eliminates final machining operation.

*Inland Ledloy License

ARISTOLOY STEELS

COPPERWELD STEEL COMPANY
(STEEL DIVISION) WARREN, OHIO

For further details write for free booklet, "Lead Treated Steels".

Room air conditioner sales up 600 pct

A 600 per cent jump in just five years! That's the astonishing record hung up by the room air conditioner makers. The result: a lusty new user of steel sheets virtually overnight, for most of these units are encased in housings of sturdy sheet steel.

A very sizable portion of these steel sheets are Bethlehem-made. Air-conditioning, in turn, is just one of dozens of lines of manufacturing that have grown into important consumers of Bethlehem sheets in the past few years. Add them all up, together with continuing requirements from longer-established sheet users, and it's easy to see why Bethlehem is being called on to manufacture sheets in larger volume than ever before.

And we're doing just that. Our sheet mills at Sparrows Point and Lackawanna are turning out hot-rolled and cold-rolled sheets at record pace, in the effort to catch up with unprecedented demand. Early this year we established a new all-time high in sheet production. During the following month we topped even that. And we're continuing to keep hard at it!

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM SHEETS

BETHLEHEM STEEL

The Iron Age

DIGEST OF THE WEEK

Vol. 175, No. 25, June 23, 1955

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THE IRON AGE, published every Thursday, with an additional issue in June, by CHILTON CO. (INC.), Chestnut & 56th Sts., Philadelphia 39, Pa. Entered as second class matter, Nov. 8, 1932, at the Post Office at Philadelphia under the act of March 3, 1879. Price to the metalworking industries only, or to people actively engaged therein, $5 for 1 year, $8 for 2 years in the United States, its territories and Canada. All others $15 for 1 year; other Western Hemisphere countries, $15; other Foreign Countries, $25 per year. Single copies, 50¢. Annual Review Issue, $2.00. Cables: "Ironage," N. Y.

Address mail to 100 E. 42 St., N. Y. 17, N. Y.

NEWS DEVELOPMENTS

COLD EXTRUSION IS BUILDING A FUTURE — P. 51
This war-born industry is developing new applications in military and civilian industry. New capacity is being built and progress is being made technically. But full industry stature is some years away. One of the big problems is a better understanding of the process and the need for technical know-how.

MORE STEEL EXPANSION IS COMING — P. 53
Office of Defense Mobilization may be about to offer tax incentives for more steel expansion. Expected cushion for defense has disappeared in current boom. Steel executives believe from two to four million tons a year is needed to keep up with growing economy. IRON AGE predicts 13.7 million more tons by 1959.

AUTOWORKERS WON MORE THAN A PRINCIPLE—P. 54
Fat pension increases and vested pension rights were big gains for the UAW. Hospitalization benefits were also improved significantly. GM gave in on union shop and moved to remove some pay inequities. Skilled workers also benefited by larger raises.

FOREIGN AID SPENDING PAYS DIVIDENDS — P. 55
Figures show that mutual defense aid stimulates defense spending by our allies. Mutual Defense Assistance spending in next 2 years will run between $6 billion and $8.4 billion. Off-shore purchases help build up allies' production facilities.

ANTITRUST HEARINGS DISAPPOINT POLITICOS—P. 56
Politicians who had hoped to make political hay out of the antitrust hearings have been disappointed by testimony to date. Steel and auto witnesses have seen nothing wrong with bigness as such. Lawmakers had hoped to collect big-versus-small testimony that could be turned to political advantage during campaign.

FIVE-TUBE DRAWBENCH UNVEILED — P. 57
Aetna-Standard shows new models of large capacity equipment capable of drawing five tubes at once. Drawbench capacity ranges from 150,000 lb pull at 110 fpm to 50,000 lb at 330 fpm. Drawbench features pneumatically operated head for gripping tubes.

BUILDER MASS PRODUCES NEW SCREW MACHINE—P.79
Brown & Sharpe is going all out on its new screw machine. The company has set up a production line fully tailored to the new model. New outlay demands volume sales; gives fast delivery, reduced training time.

IN METALWORKING

ENGINEERING & PRODUCTION

HOW TO IMPROVE DEEP DRAWING QUALITY — P. 91
Strain aging is a major problem in deep drawing operations. It results in "stretcher strains" which mar appearance. Some aged materials even tear in the press. A vanadium addition can prevent "stretcher strain" in deep drawing sheet.

VACUUM SETUP PLAYS DUAL MELTING ROLE — P. 95
Using new, high capacity vacuum equipment with a unique furnace design, Carboloy Dept. is expected to increase GE's production of vacuum-melted alloys substantially. Semi-continuous output of gas and oxide-free commercial alloys is slated to reach 120,000 lb monthly.

BLAST DEFLASHING CUTS FINISHING COSTS — P. 98
Savings in finishing costs come to as much as $2000 per month at one company through the use of airless abrasive blasting. The method replaces conventional hand deflashing and deburring. Inspection standards, surface uniformity and appearance of parts have all been greatly improved.

NEW WHEEL POLISHES COMPLEX SHAPES — P. 102
Folded packets of coated abrasives contained in a simply-designed cage make up a new contoured wheel for polishing complex part surfaces. Designed mainly for high production setups, the new wheel provides fine surface finishes and longer wheel wear.

LAB ROLLING MILLS AID MATERIALS STUDY — P. 104
Heavier, sturdier laboratory rolling mills, offering greater control and increased flexibility, have been developed to meet modern metallurgical needs. Improved mills have been designed to handle many new high hardness, high strength materials. Accessories for packaged mills permit changes to meet special conditions with minimum amount of redesign.

MARKETS & PRICES

CARBON DIOXIDE EXPANDS ITS USES — P. 58
CO_2 is out of the pop bottle and into metalworking fields. Market in 1955 may beat $47 million. Many new uses in industry in foundry core hardening, shielded welding, as coolant for machining, steel hardening, investment casting and purging.

MORE STEEL IS GOING INTO NEW HOUSES — P. 59
Average consumption of steel per housing unit is on the rise. Trend back to bigger houses is a factor. Experts estimate that 3.5 tons of steel could easily be used in a 6-room home. Erector-set type of steel home construction is forerunner of tomorrow's all-steel home. But mass production is yet to come.

WEST AIRCRAFT BOOMS ON AIRLINE ORDERS—P. 77
$750 million in orders keeps southern California firms busy. Lockheed and Douglas are in competition for business. Douglas has $500 million backlog of propeller-driven aircraft orders. Lockheed Electra makes 414 mph. American buys 35 of them.

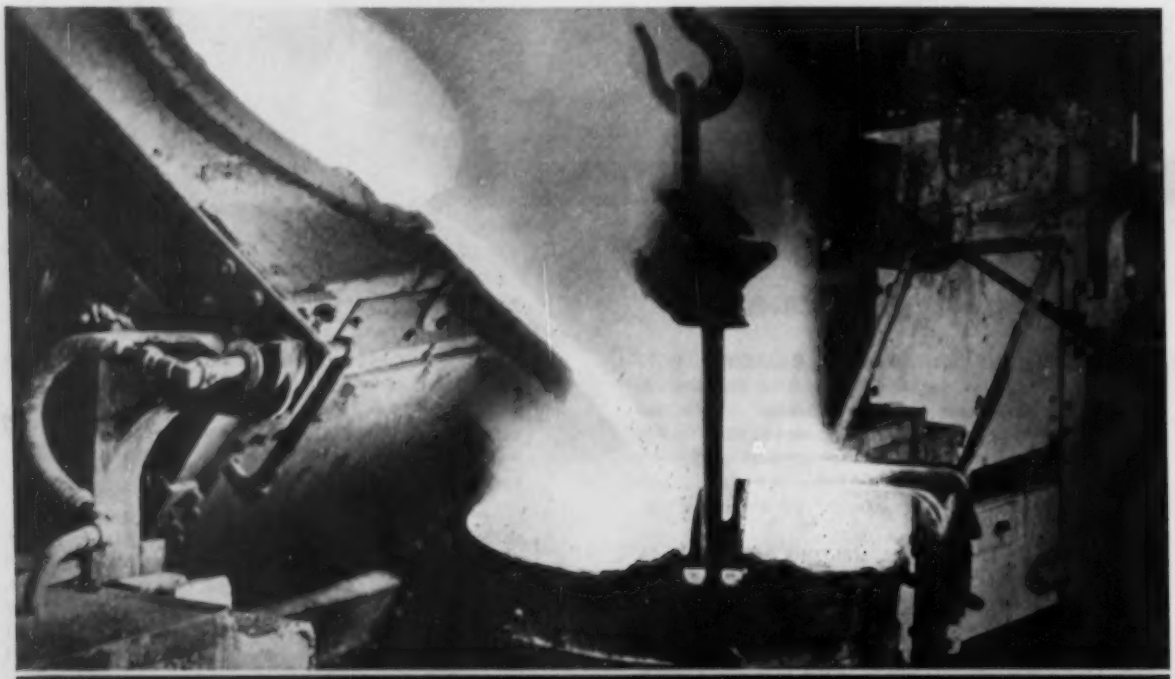
STEEL WAGE TALKS ARE DOWN TO HARD FACTS—P. 135
Labor and industry negotiators are talking cases this week. With the preliminaries out of the way, both sides are pressing for their type of settlement. Final outcome will be a hard compromise for labor and industry. As estimated earlier by IRON AGE, the outcome will give labor between 10¢ and 15¢ an hour. This will be followed by a price boost averaging $4.50 a ton, with some products rising as much as around $6 a ton.

CARRYOVERS: THE PROBLEM GETS WORSE — P. 136
One of the biggest problems facing steel producers is the heavy carryovers on such products as sheets, bars and plates. Even though some mills are deducting June carryover from July tonnages, they will still lag behind on deliveries going into August. Topping these worries, mills are under pressure to turn out more light plate on their sheet mills.

NEXT WEEK:

PLATING MACHINE GIVES HIGH ANODIZING RATES
An anodizing setup, based on a return-type electroplating machine design, is turning out 12 times as much work normally done by manual processing. Coating uniformity and quality are considerably superior. Maintenance is negligible and the system requires a minimum of floor space in the plant.

HOW WILL STEEL PAY FOR COMING WAGE BOOST?
Where will the money come from to pay for the wage increase granted to steel workers? The steel companies have only one source: higher prices for their products. These higher prices in turn will mean increased pressure on prices of finished goods made of steel. Another price spiral will complete the old wage-price cycle.



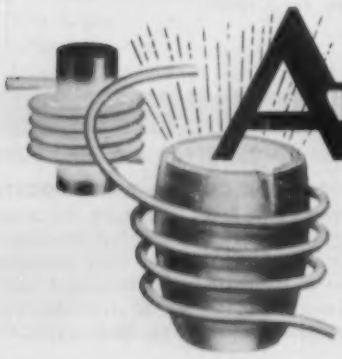
6 tons of steel melted and poured every 2½ hours

SPEED . . . CONTROLLED QUALITY . . . ECONOMY —these advantages are enjoyed on every melt, ferrous or non-ferrous, in Ajax-Northrup induction furnaces. This furnace for example, turns out a six-ton charge of nickel alloy—precisely alloyed and virtually free of impurities—every 2½ hours.

Ajax induction melting puts substantially all the heat in the charge proper. No power is wasted in superheating crucible or refractory, and little heat escapes into the room. Speed of melting and electromagnetic stirring insure perfect alloys every time.

Ajax has been building induction furnaces for all metals since 1916. Installations capable of producing up to 20,000 pounds of metal per hour are in operation, and more and more foundries are switching to Ajax-Northrup melting as they discover its economy and advantages. Learn why in Bulletin 27-B, available upon request to Ajax Electrothermic Corporation, Trenton 5, New Jersey.

Associated Companies Ajax Electric Company—Ajax Electric Furnace Co.—Ajax Engineering Corp.



AJAX NORTHRUP SINCE 1916

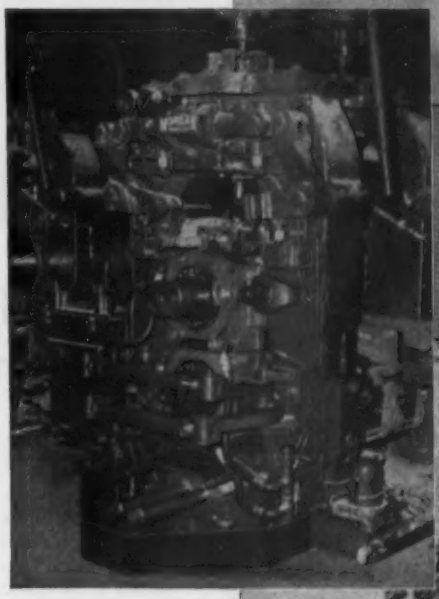
INDUCTION HEATING-MELTING

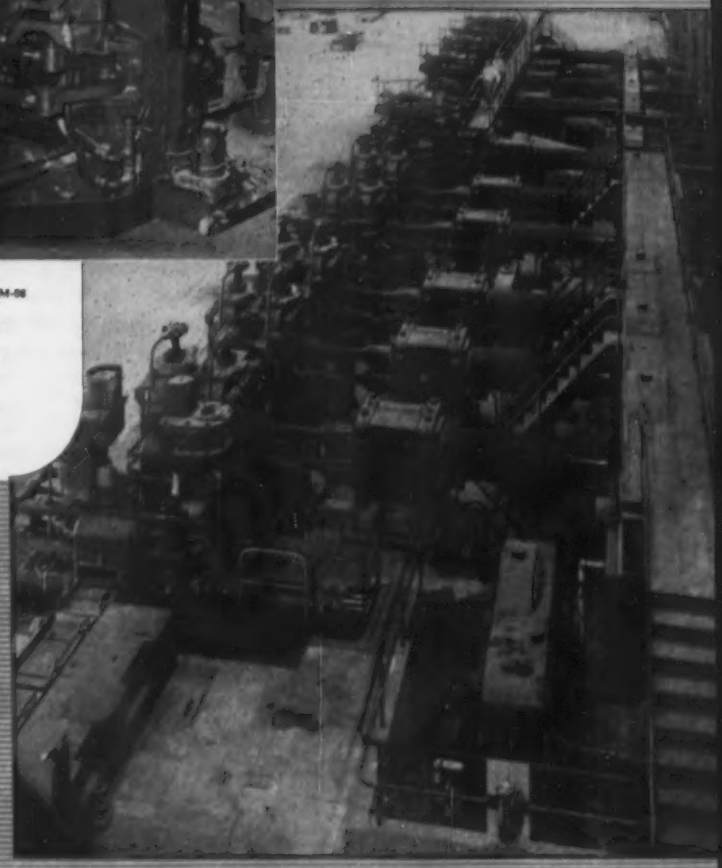
FAIRLESS Makes Records

WITH NEW

MORGAN Skelp Mill

Hailed as one of the great strides toward the increase in American steelmaking capacity is the Fairless Works of the United States Steel Corporation at Morrisville, Pa. National Tube Division's 18" Skelp Mill, a vital part of this enterprise, was designed and built by Morgan Construction Company. Product gauge is assured by rigid closed top roll housings and MORGOIL roll neck bearings. Four ton slabs of steel become four ton coils of high quality skelp. For these, Morgan handling equipment meets exacting requirements for the safety and comfort of the mill operators with no loss of efficiency.





RM-08

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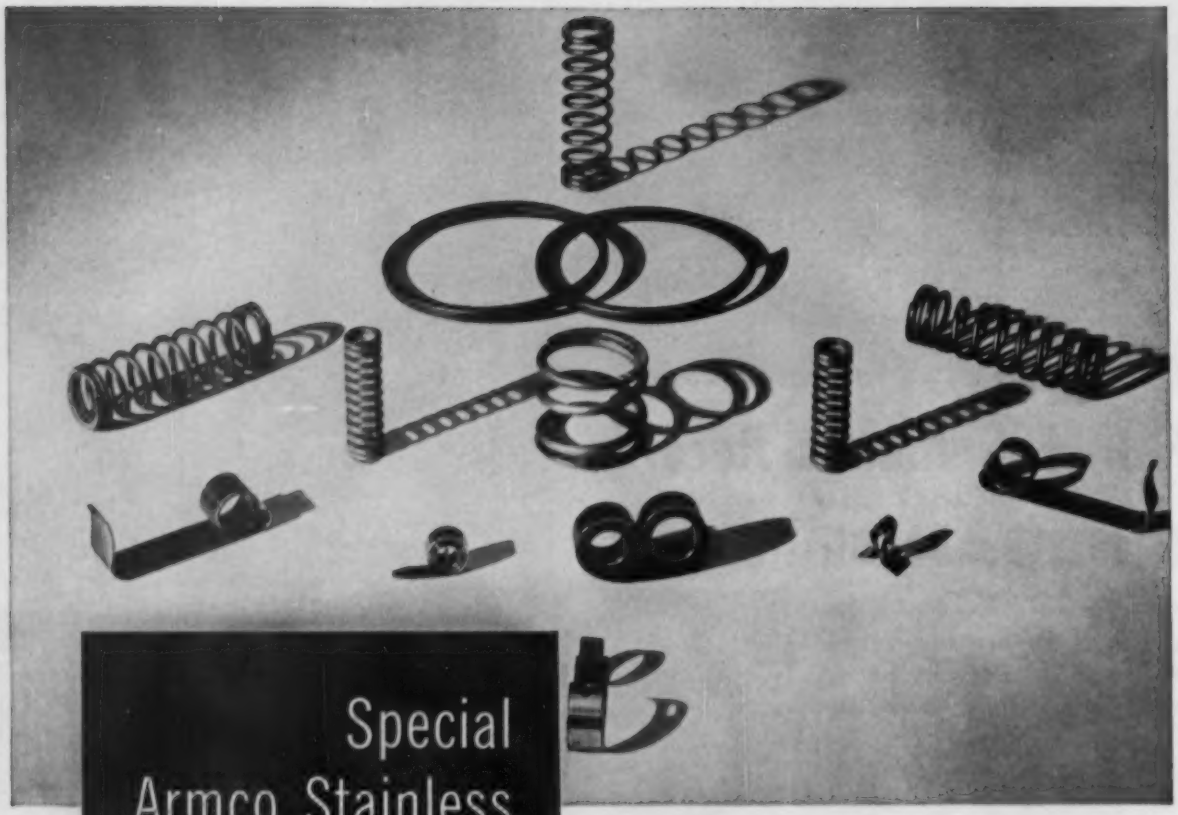

Special Armco Stainless Spring Wire HAS STRENGTH OF MUSIC WIRE

A special Armco Stainless Steel, known as 17-7 PH, has proved far superior to 18-8 as a spring material. It is also better than non-ferrous spring wire in applications where higher strength is needed. Here are some of the characteristics of this grade of stainless steel.

High Load Capacity

Mechanical properties and modulus of elasticity of Armco 17-7 PH Stainless Steel wire are generally comparable to music wire. This means that the same spring capacity can be obtained in a corrosion and heat resistant spring as in a carbon steel spring, without increase in size.

High Elastic Limit

Armco 17-7 PH springs have a wide deflection range in which they are safe from permanent distortion. This is because of the high torsional elastic limit of the wire — 55 per cent of the ultimate tensile strength.

Better at Elevated Temperatures

Relaxation of helical compression springs of Armco 17-7 PH at temperatures up to 650 degrees F is considerably less than for 18-8 or music wire.

Torsional modulus of 11,000,000 psi is less affected at temperatures up to 650 degrees F than 18-8 or music wire.

Dimensional Stability

After fabrication, only a single heat treatment at 900 degrees F is required to develop full mechanical properties and this treatment stress-relieves as well. Spring dimensions are not affected by this hardening treatment because of the high dimensional stability of Armco 17-7 PH.

Armco 17-7 PH is supplied for coil or flat springs, in bars, sheets, strip and plates. A companion precipitation-hardening grade, Armco 17-4 PH, is supplied in bars.

For further information, write us at the address below.

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Indexed in the Industrial Arts Index and the Engineering Index.

EPA NBP

Editorial:

What's The Worker's Attitude?

◆ WITH TWO big auto companies having accepted responsibility for unemployment of their workers this may be a good time to take a look at worker attitudes. It may be hard for some of us to take, but the truth is always a help in the end—after we get used to living with it.

Many top level people have forgotten how they felt when they were way down the line. They had to in order to be good executives. Those who are near the top have only a vague recollection of how hourly workers in mass industries think.

Negotiators and personnel people know a lot about workers and their attitudes. But they don't always tell their bosses all they know. Their job is to get the best bargain and the best man for the job. That is a tough assignment today.

But the workers in mass production industries are pretty sure of what they want. They must have something to keep their egos intact in this complex industrial picture. They have this in their union—kind of a mother complex, industrially speaking. They always back the union—even when they gripe.

A combination of the last big depression, the New Deal, the H bomb and the smooth talkers has made almost everyone security conscious. This shows up regularly in workers demanding, through their unions, a big wage increase (to take care of the present) and a big fringe deal (to take care of the future).

Wage earners are not interested in knowing intricate facts about "real" purchasing power. They want the green stuff. A fifty dollar bill won't buy nearly as much as it did twenty years ago, but it still stirs a lot of comment when someone flashes one around. The rounds of wage increases have set a pattern where labor demands—and gets—one a year.

The worker in big industries—and in small ones too—is interested in getting through the workday and out of the plant. Most of them know they won't become top dogs in the plant. So they want all the houses, gadgets, cars, hobbies and gracious living that they can get. And that's what they are going to get when they are sitting in the driver's seat.

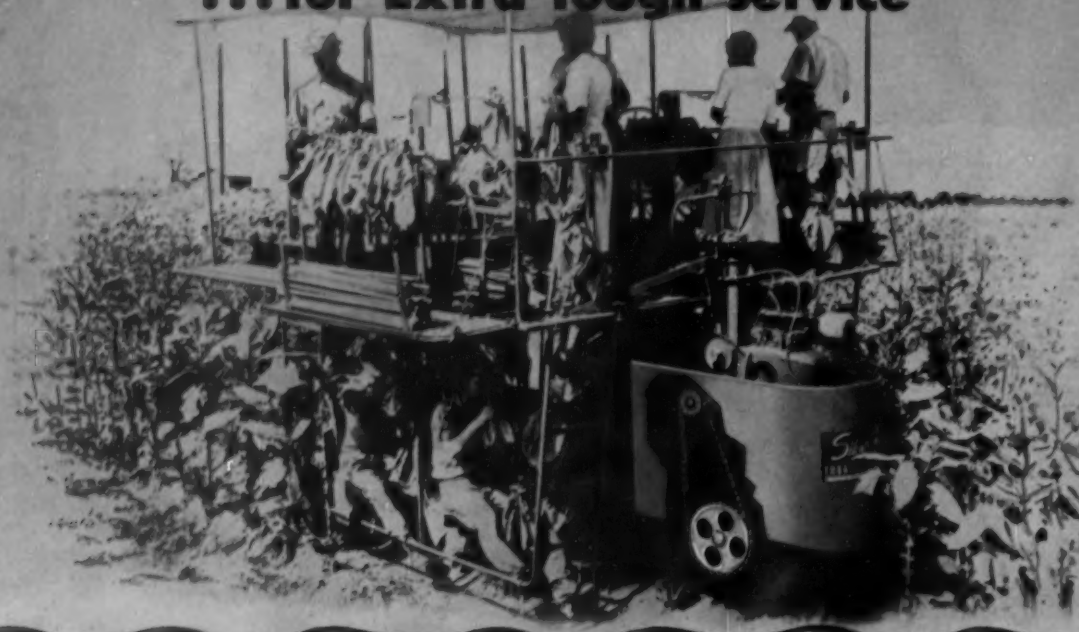
What they will get when and if the bubble bursts will happen to you as well as to them. That's the frustrating part of it.

Tom Campbell

EDITOR

SELF-CLEANING...ABRASION RESISTANT

...for Extra tough service



Revolutionary Tobacco Harvesters

Rely on ATLAS CHAIN to keep going in mud and sand

Tough abrasive action of sand, dirt and mud is the type of punishment Atlas Chain and Sprockets must take on this "Silent Flame" Tobacco Harvester manufactured by the Long Manufacturing Company. The chain and sprockets are bombarded by an endless stream of dirt kicked up by the wheels and at times actually operates with the chain churning a path out of the mud and sand.

This is the type of service that has proved the extra wear built into every link of Atlas Chain. Plates, pins and bushings are super-toughened by Atlas' exclusive heat treating process assuring stronger operating chain over longer periods. Rollers, pins and bushings are "Micro-Finished" to exact tolerances for smooth, quiet operation.

Whether a standard pitch chain as used on the drive . . . a special extended pitch as on the leaf conveyor . . . or the sprockets throughout the harvester, Atlas makes a complete line of precision matched chain and sprockets to meet every requirement. Write for your copy of the new handbook on chain and sprockets ARC-55.

ATLAS CHAIN & MANUFACTURING COMPANY · DOYLESTOWN, PENNA.

ATLAS ROLLER CHAIN AND SPROCKETS

dear editor: *letters from readers*

Anodized Coatings

Sir:

We would like to have your permission to reprint the article entitled, "Anodized Coatings: What They Are—How They Behave," from your May 26 and June 2 issues.

We want to use these for distribution both inside and outside Revere, and in order to reproduce them we would be grateful if you would send us six sets of tear sheets.

Full credit will be given to THE IRON AGE and the copy will appear exactly as set up. *D. F. Haggerty, Asst. Advertising Manager, Revere Copper & Brass, Inc., New York, N. Y.*

Trademark Stamp

Sir:

In the June 2 issue of THE IRON AGE, under the subject of Newsfront, you have an item headed "Trademark Stamp Costs Cut."

We are very much interested in this and would appreciate your letting us know the source of this information. *W. J. Bickmore, Jas. H. Matthews & Co., Pittsburgh.*

Details on the carbide trademark stamp may be obtained from Raytheon Mfg. Corp., Waltham 54, Mass.—Ed.

Electronic Computer

Sir:

In the June 2 issue of THE IRON AGE under the heading Newsfront, there is an item captioned "Solves Machinability Problems Quickly."

We would like to get additional information on this machinability computer and would like to get the name of the company to be contacted. *F. H. Bryant, Secretary, The Western Automatic Machine Screw Co., Elyria, Ohio.*

Further information on the electronic machinability computer may be obtained from the Carboloy Dept. of General Electric Co., Box 237, Roosevelt Park Annex, Detroit 32, Mich.—Ed.

Atomic Test

Sir:

I would like to receive tear sheets of the information published in your magazine concerning the results of the recent Atomic Test. These articles were on p. 62 of the May 12 issue and p. 61 of the May 26 issue. *M. K. Snyder, Steel Buildings Div., Butler Mfg. Co., Kansas City.*

Fastening

Sir:

Please forward any further information you may have on the screw feeding device listed in Technical Briefs, p. 101, of your June 9 issue. *H. Lee, Tool Room Foreman, Buchanan Electrical Products Corp., Hillside, N. J.*

Further information may be obtained from Pneumo-Servo, Inc., 19930 Detroit Road, Rocky River, Cleveland, Ohio.—Ed.

Temperature Control

Sir:

We would appreciate your sending us 24 copies of the article "Temperature Control — Key to Longer Pot Life" from the Jan. 20 issue. *R. C. Kleinecke, Asst. to Manager, National Lead Co., Pittsburgh.*

Beryllium Copper

Sir:

It would be appreciated if you could send us three or four tear sheets of an old article entitled "How to Heat Treat Beryllium Copper," Feb. 24, 1949, issue. *N. W. Bass, Vice-President, The Brush Beryllium Co., Cleveland.*

a 4 in 1 metal working tool!

di-acro* BOX FINGER BRAKE

Accurately, Easily, Quickly Form and Duplicate a Wide Variety of Shapes in Metal as Heavy as 16 Gauge—Widths up to 24" —with Versatile Di-Acro Brakes.

A number of forming jobs can be done with the Di-Acro Box Finger Brake, by simply adjusting or changing the type of mounting bar on the contact surface. Di-Acro Finger Brake is:

- **Box and Pan Brake** — when equipped with a complete set of Box Fingers.
- **Open End Brake**— when Open End Finger is installed in place of Box Fingers.
- **Bar Folder** — when an Acute Angle Bar replaces the Box Finger Bar mounting.
- **Standard Brake** — when a Forming Bar is mounted for heavy operations.

Di-Acro Standard and Radius Brakes are also available. Ten models in all.

*pronounced Die-ack-ro

WANT MORE INFORMATION?

Send for New 32-Page Catalog

Gives facts on Di-Acro Brakes and also both hand and power operated Di-Acro Benders, Notchers, Punch Presses, Rod Parters, Rollers and Shears. Mail your request today.

Creators of "Die-Less Duplicating"

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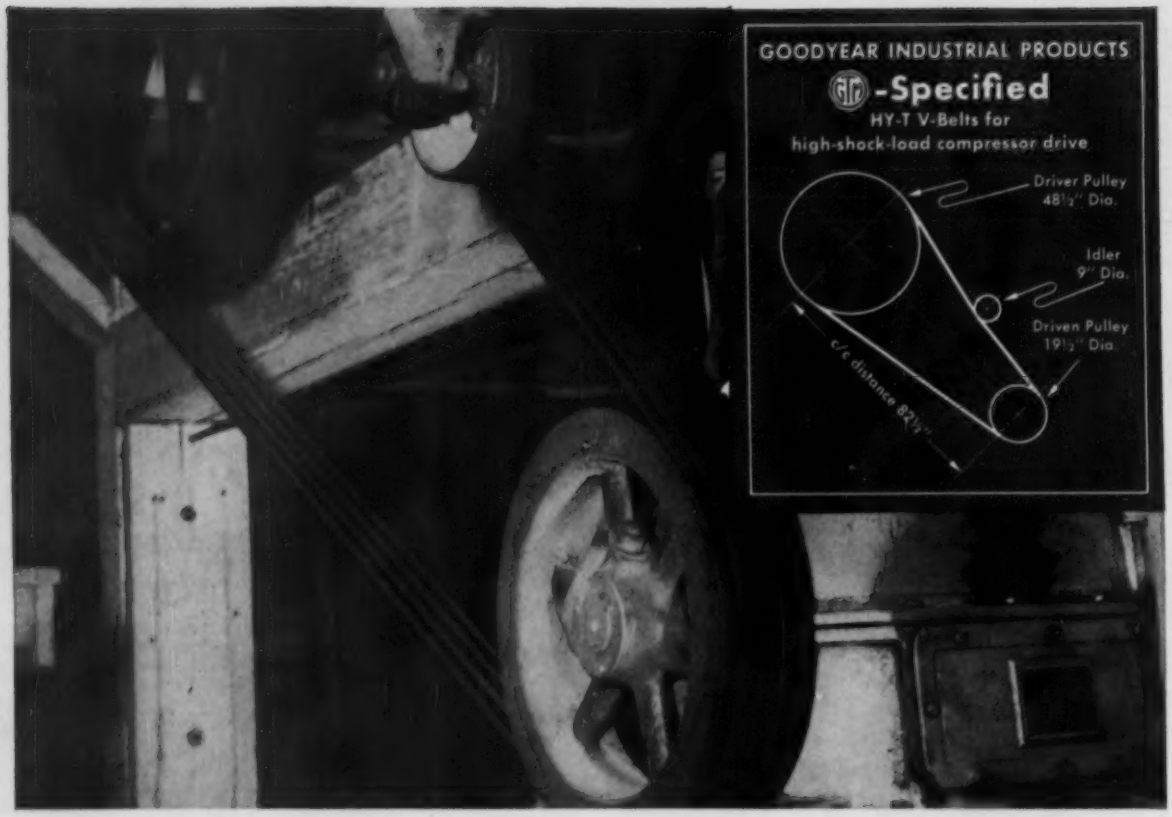
di-acro PRECISION METALWORKING MACHINES



Saved the cost of 3 sets of belts

and still going strong on tough compressor drive

BELT-BREAKING problem for a Southern lumber company was overloading on a compressor drive. Frequent and sudden shock-loads kept belt-life down to 6 months, meant costly shutdowns and expensive replacements.

Called in for consultation, the G.T.M.—Goodyear Technical Man—recommended HY-T V-Belts. Their multiple plies of chemically produced 3-T CORD are tempered by Time, Tension and Temperature to eliminate surplus stretch. They can carry 40% greater horsepower loads at speeds from 100 to 6,000 f.p.m.—have maximum resistance to oil, moisture, mildew and static generation.

Result: The HY-T V-Belts easily took the shock-loads in stride, are still running after 24 months—4 times the service life of the standard V-belts they replaced—saving the cost of 3 sets of belts to date.

If you have drive troubles call in the G.T.M.—the man who knows V-belts best. Contact him through your Goodyear Distributor or by writing to:

Goodyear, Lincoln, Nebraska or Akron 16, Ohio

YOUR GOODYEAR DISTRIBUTOR *can quickly supply you with Hose, Flat Belts, V-Belts, Packing or Rolls. Look for him in the yellow pages of your Telephone Directory under "Rubber Products" or "Rubber Goods."*

Hy-T—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

HY-T V-BELTS with 3-T CORD by

GOODYEAR

THE GREATEST NAME IN RUBBER

fatigue cracks

by William M. Coffey

Report on Detroit

Just returned from a little airtrek to Detroit and must tell you this story. While checking on flight time with one of those attractive airline girls at the Detroit airport, we were repugnantly (*fr.*) drawn to a large and noisy character next to us who was in some kind of a wrangle with another of those nice girls, a very cute little number. This fellow didn't like the way the airline was run. Flight times weren't posted on the board where a man could see them. Telephones were never answered. Planes were late. Planes were noisy. Couldn't understand how anybody could call this an airline.

And he got louder and louder and went on and on. The nice little number, very curteous and surprisingly quite serene under this barrage tried repeatedly (between blasts) to get across her point. She never got further than, "Mr. Wrangle, your plane—," however, when another complaint would come thundering through. Mr. Wrangle covered everything he could think of. Did you know he was a pilot himself? Logged 40,000 miles blindfolded, It went on for over half an hour.

A goodly group of people collected, some ready to bash this guy in the nose. And the nice little number kept trying, *"Mr. Wrangle, your flight—."* When he finally ran down, our nice little number finally finished her sentence. She said, *Mr. Wrangle, your plane left fifteen minutes ago. The next flight won't be for two hours."* The spontaneous demonstration of uncontrolled laughter that followed practically ripped off the roof. Our little number giggled so hard she had to sit down. And so did we. But not with her, darn it.

* * *

What's black and white and red all over? An embarrassed zebra. (*That's as close to a "jackass joke" as we can come.*)

The Money

Nearly every day people thoughtfully send us all kinds of interesting things about IRON AGE's past—this in celebration of our 100th Anniversary. Mr. A. E. Moredock, Westinghouse Electric Co., Pittsburgh, kindly sent us a newspaper account of the history of the telephone in Pittsburgh. Seems THE IRON AGE had the first business telephone ever installed in Pittsburgh, in 1877!

We would also like to point out to our 24 loyal readers that we very early pioneered with teletype machines and now have them in New York, Phila., Pittsburgh, Cleveland, Chicago, Washington and Detroit. For many years these machines have given us an "edge" in fast reporting. We couldn't have been as fast in printing that Ford wage settlement story in June 9 issue, for instance, without them. The teletypes in New York, Detroit and Phila. were being played like hot typewriters right up to press time—and we were able to give you a full, interpretive account even though we had to rip out the original "number one" story to do it—an hour before press time. Keep sending the money.

Puzzlers

Our pig-latin puzzler (June 2 issue) from "the second worst metallurgist east of the Mississippi" translates like this:

Abie, see the Iron Ages
Why, them aren't Iron Ages
Yes, they are, too, Iron Ages.

. . . and the winners: Charlsie and the group from Granite City, and Miss M. H. Berberich, U. S. Steel. Oh, joy.

New Puzzler

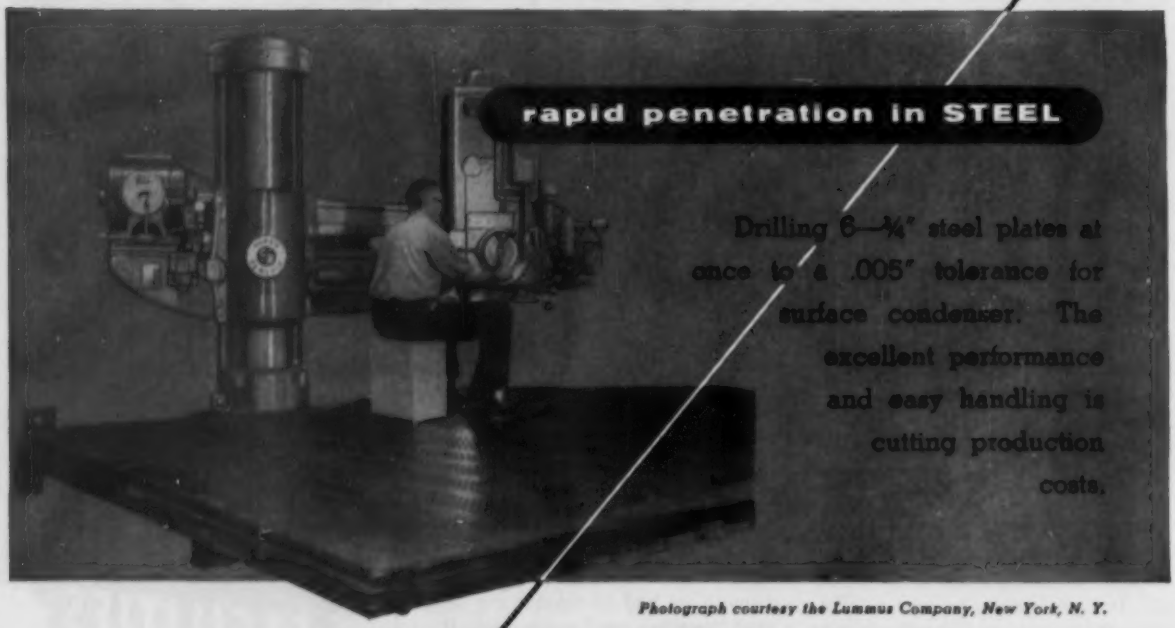
Construct two isosceles triangles with one common side, so that two of them form another isosceles triangle. Many thanks to W. E. Vornovich, Cleveland.

33% DECREASE IN DIE WEAR
ON THIS GRAY IRON FITTING
...thanks to
FERROCARBO®
Users everywhere report similar experiences. In fact, on 67 machining tests in 11 large machine shops, castings of gray iron treated with FERROCARBO averaged 89.5% greater machinability per tool than untreated castings. These premium castings are finer-grained, denser, stronger, yet they COST YOU NO MORE... because your foundryman, using FERROCARBO, makes worthwhile savings in raw material costs.
FOR FREE BOOKLET on FERROCARBO, citing actual case histories of faster machining, with longer tool life, write The Carborundum Company, Dept. 45, Niagara Falls, N.Y.
CARBORUNDUM®

rapid drilling with ACCURACY saves money

at THE LUMMUS COMPANY

On jobs like these the ease of control, the accuracy and the outstanding speed of penetration of Cincinnati Bickford Radial Drills pay big dividends.



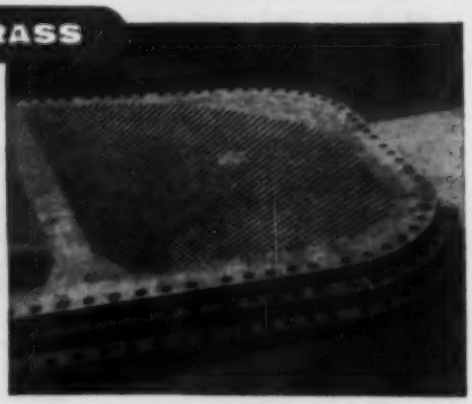
rapid penetration in STEEL

Drilling 6—¼" steel plates at once to a .005" tolerance for surface condenser. The excellent performance and easy handling is cutting production costs.

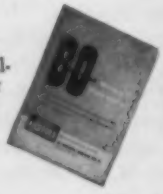
Photograph courtesy the Lummus Company, New York, N. Y.

rapid penetration in BRASS

Drilling 4 brass tube sheets, 1½" thick, simultaneously to a .002" tolerance, a special spiral brass drill penetrates at the rate of 10" per minute.



Of interest to every user of Drilling Machines—Write for your copy of 80-year Anniversary Booklet.



CINCINNATI BICKFORD

RADIAL AND UPRIGHT DRILLING MACHINES

THE CINCINNATI BICKFORD TOOL CO.

Cincinnati 9, Ohio, U.S.A.

dates to remember

JUNE

AMERICAN SOCIETY OF MECHANICAL ENGINEERS—Diamond Jubilee semi-annual meeting, June 19-23, Statler Hotel, Boston. Society headquarters are at 29 W. 39th St., New York.

NATIONAL ASSN. OF COST ACCOUNTANTS—36th international cost conference, June 19-23, Waldorf-Astoria Hotel, New York.

AMERICAN ELECTROPLATERS' SOCIETY—42nd annual convention, Cleveland Public Auditorium, Cleveland, June 20-23.

EXPOSITIONS

AMERICAN ELECTROPLATERS' ASSN. —42nd annual exposition, June 20-23, Cleveland Public Auditorium, Cleveland.

MACHINE TOOL SHOW—Presented by National Machine Tool Builders' Assn., International Amphitheatre, Chicago, September 6-17, inclusive. This is the first industry-wide showing since 1947 of the advances in machine tools.

AMERICAN SOCIETY FOR ENGINEERING EDUCATION—June 20-24, 63rd annual meeting to be held at The Pennsylvania State University, University Park, Pa. Guest speaker is to be Secretary of Defense Charles E. Wilson.

ALLOY CASTING INSTITUTE — Annual meeting, June 26-28, Hot Springs, Va. Institute headquarters are at 32 Third Ave., Mineola, New York.

AMERICAN SOCIETY FOR TESTING MATERIALS — Annual meeting, June 26-July 1, Chalfonte-Haddon Hall Hotel, Atlantic City, N. J. Society headquarters are at 1916 Race St., Philadelphia.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS — Summer general meeting, June 27-July 1, New Ocean House, Swampscott, Mass.

JULY

NATIONAL HOUSEWARES AND HOME APPLIANCE MANUFACTURERS EXHIBIT — July 11-15, Auditorium, Atlantic City, N. J.

WESTERN PLANT MAINTENANCE AND ENGINEERING SHOW — July 12-14, Pan Pacific Auditorium, Los Angeles. Management: Clapp and Poliak, Inc., New York.

DROP FORGING ASSN.—Annual meeting, July 19-22, Grove Park Inn, Asheville, N. C., Assn. headquarters are at 605 Hanna Bldg., Cleveland.

TRUCK TRAILER MANUFACTURERS ASSN., INC.—Summer meeting, July 21-23, Detroit. Association headquarters are at Room 710 Albee Bldg., Washington.

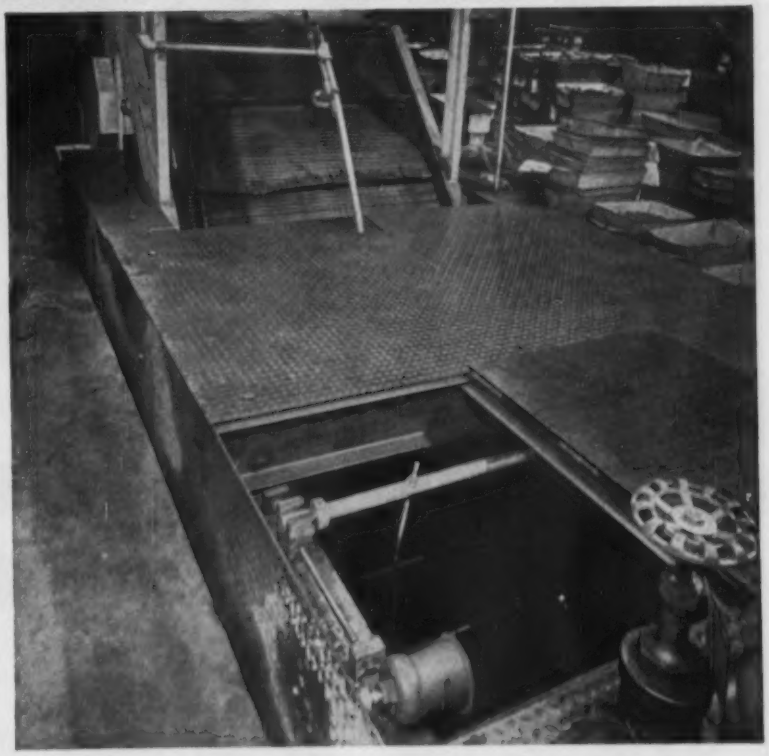
NATIONAL JEWELRY FAIR—July 24-28, Conrad Hilton Hotel, Chicago.

AMERICAN TRADE ASSN. EXECUTIVES — Annual meeting, July 31-August 3, Grand Hotel, Mackinac Island, Mich.

AUGUST

AMERICAN SOCIETY OF TRAINING DIRECTORS — 2nd Annual Institute, August 7-20, Eagle Waters Resort, Eagle River, Wisconsin.

HOT SPOT IN HARTFORD!



1575 GALLONS OF OIL NEAR A 1700° FURNACE!

A king-size oil quench is a bad enough fire hazard by itself. Put it next to a roaring, 1700 degree hardening furnace, and it could turn a plant into a cinder pile!

So the Allen Manufacturing Company discovered when they installed this hardening and tempering machine in their Hartford, Connecticut plant!

From the hardening furnace, hex-socket screws are quenched in oil, tempered, then quenched again. A flash fire in the huge oil quenching bath could mean loss of the machine, costly down time—and possible loss of the entire plant!

Safety-minded Allen executives naturally took proper precautions, held the oil far below its flash point with thermostatic temperature controls. Still, they realized that more protection was needed! So Allen called on Kidde — long-time specialists in fire extinguishing systems.

Kidde engineers studied the problem, installed a special carbon dioxide extinguishing system which could be triggered instantly.

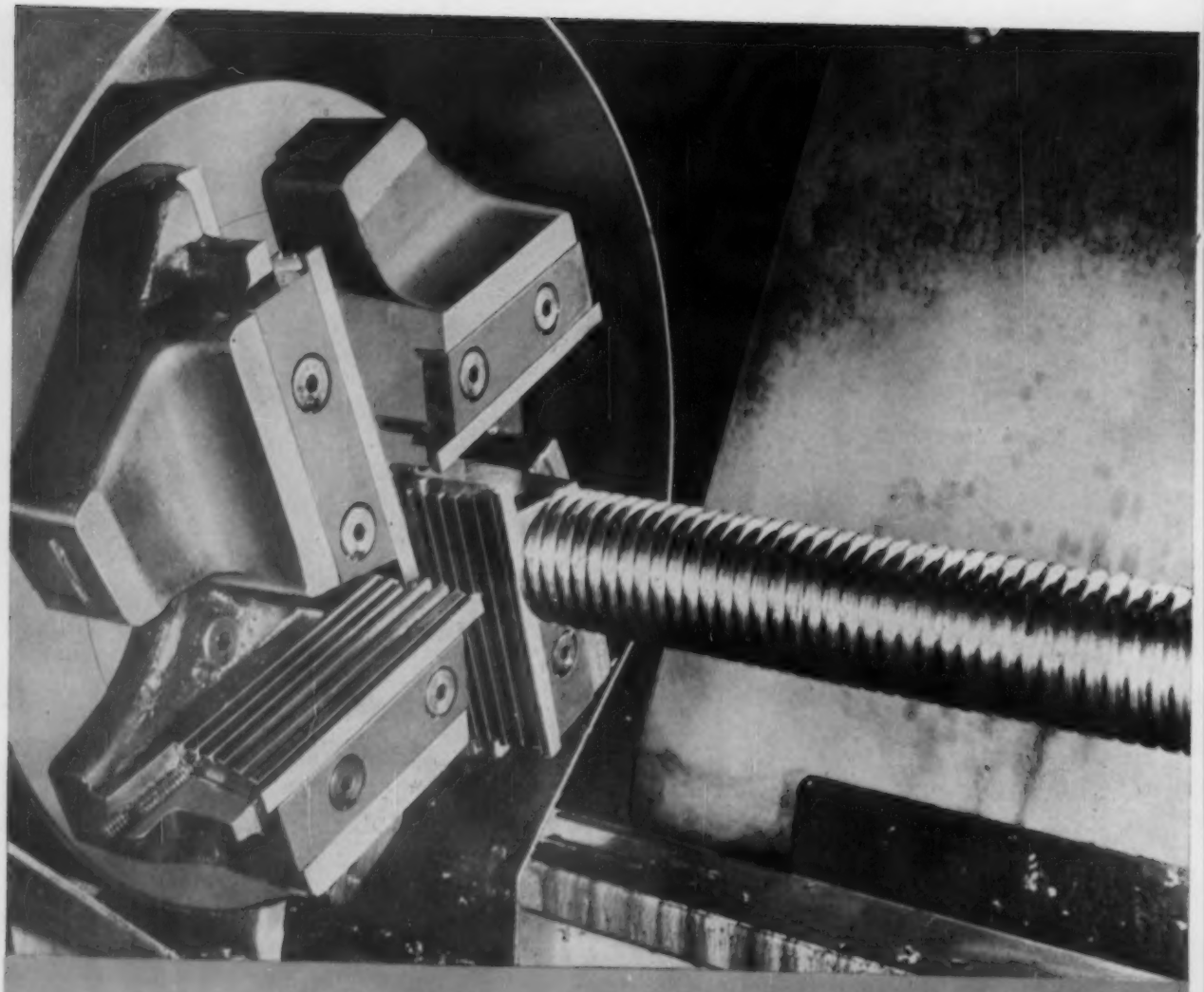
If fire strikes, one pull on a control handle pours clouds of fire-killing CO_2 over the blaze, snuffing flames in seconds. At the same time, pressure-operated switches in the lines automatically shut down feed and conveyor motors!

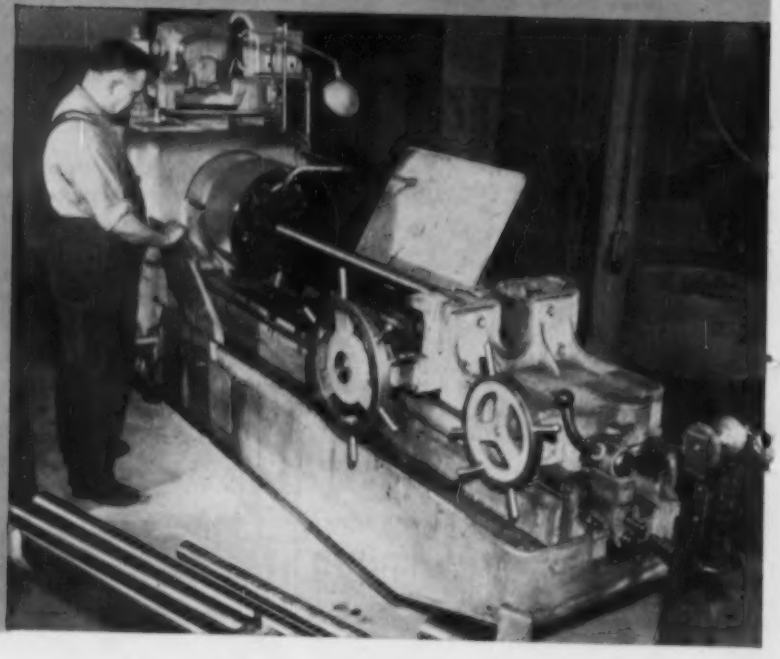
All fire hazards—dip tanks, flammable liquids and electrical equipment — are potential plant-wreckers. Make sure they get the *proven* protection of Kidde extinguishing equipment. Call your Kidde agent today!

Kidde (K Kidde)

Walter Kidde & Company, Inc.
649 Main Street, Belleville, 9, N. J.
Walter Kidde & Company of Canada, Ltd., Montreal—Toronto

The words 'Kidde', 'Lux', 'Lux-O-Matic', 'Fyre-Freez' and the Kidde seal are trademarks of Walter Kidde & Company, Inc.





90%

threading time saved

on power screws

This large saving in the production of power screws at Rodney Hunt Machine Co. (Orange, Mass.) was made possible by the use of a LANDMACO Threading Machine.

Specifications require 2¾" diameter—2½ pitch Acme threads 56" long on cold-rolled steel. 5 hours had previously been required to complete the thread. Floor-to-floor threading time was cut to only 30 minutes after the installation of a LANDMACO 32C Single-Spindle Machine with a special 60" carriage travel.

Many features in the design of this equipment make it possible to do heavy duty threading to precision tolerances. Heavy construction and leadscrew feed assure accurate threading. Slippage of the work is prevented by an improved carriage front with 60% greater gripping power.

Massive construction of the 4" LANCO head and chaser-holders give maximum support to the chasers for the largest or smallest diameters. The tangential design of the chasers provides lateral absorption of cutting strains and free cutting action. Their roughing-and-finishing form assures threads of excellent finish in one pass, and the centering throats eliminate the out-of-roundness common in long workpieces.

This is but one example of the production economies to be derived from using LANDIS Equipment on large diameter threading. For additional information, please send specifications and ask for Bulletin #*H-45*.

The World's

Largest Manufacturer of Threading Equipment - Cutting - Tapping - Grinding - Rolling

LANDIS *Machine* COMPANY

411-C WAYNESBORO • PENNSYLVANIA • U. S. A.

"Now, to put it together for keeps . . . here's the only thing to use . . . BRASS!"

YES, father knows best — or at least he knows his fastenings and what makes them hold fast, *and last.* Nothing else but good, *solid* Brass that you can always bank on . . . *Bristol* Brass, for example.

And more and more manufacturers of screws, rivets, pins and other cold formed products are learning of the savings to be had from the remarkable versatility of wire developed by Bristol engineers. Nothing else permits the making of more types of products and heads (round, flat, etc.) from the same stock. Once they try it, manufacturers reorder from Bristol to take advantage of the inventory simplification offered by Bristol Brass wire.

Brass wire has always been a favorite of manufacturers because it is so easy on tools and machines. And many of them specify *Bristol* Brass wire because they find it consistently uniform in gauge, temper and grain-size — and because Bristol's delivery promises *are kept.* See for yourself. Send us a trial specification *now.*

The Bristol Brass Corporation has been making Brass strip, rod and wire here in Bristol, Connecticut since 1850, and has offices and warehouses in Albany, Boston, Buffalo, Chicago, Cleveland, Detroit, Milwaukee, New York, Philadelphia, Providence, Rochester, Syracuse. The Bristol Brass Corporation of California, 1217 East 6th St., Los Angeles 21. The Bristol Brass Corporation of Ohio, 1607 Broadway, Dayton.

And now . . . BRASS FORGINGS, too . . .
The Bristol Brass Corporation announces the acquisition of Accurate Brass Company, 73rd Ave. & 88th St., Brooklyn 27, N.Y.
"How do you know it can't be forged?"

"Bristol-Fashion" means Brass at its Best

PIN POINTED FOR SERVICE

Youngstown has 28 district sales offices conveniently located throughout the nation to serve you quickly. They are staffed with men who know the steel business thoroughly and are qualified to help you with your steel requirements. You can get quick service whether you write, wire or phone your nearby Youngstown District Sales Office.

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Buffalo 2, N. Y.
1508 Liberty Bank Bldg.
Phone Washington 6270

Chicago 2, Illinois
111 W. Washington Street
Phone Franklin 2-5470

Cincinnati 2, Ohio
1302 Carew Tower
Phone Main 1424

Cleveland 13, Ohio
2400 Terminal Tower Bldg.
Phone Main 1-2605

Columbus 15, Ohio
2850 LeVeque Lincoln Tower
Phone Capitol 4-7211

Dallas 2, Texas
1602 First Nat'l. Bank Bldg.
Phone Riverside 9538

Denver 2, Colorado
814 Continental Oil Bldg.
Phone Main 3-2283

Des Moines 9, Iowa
437 Insurance Exchange Bldg.
Phone 3-1265

Detroit 2, Michigan
926 Fisher Bldg.
Phone Trinity 5-5816

Grand Rapids 2, Michigan
604 Michigan Nat'l. Bank Bldg.
Phone 9-4291

Houston 2, Texas
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520 Circle Tower
Phone Melrose 2-3461

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Phone Victor 5837

Los Angeles 15, Calif.
714 W. Olympic Blvd.
Phone Prospect 7581

Milwaukee 3, Wisc.
2110 Wisconsin Tower
Phone Broadway 1-5148

Minneapolis 2, Minn.
1050 Baker Bldg.
Phone ATlantic 2970

New Orleans 12, La.
520 Whitney Bldg.
Phone Raymond 0153

New York 36, New York
500 Fifth Avenue
Phone Lackawanna 4-4340

Philadelphia 2, Pa.
1502 Girard Trust Bldg.
Phone Rittenhouse 6-9830

Pittsburgh 22, Pa.
Two Gateway Center
Phone Atlantic 1-2350

St. Louis 3, Mo.
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Phone Geneva 6-1223

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Phone Garfield 1-6544

Seattle 4, Washington
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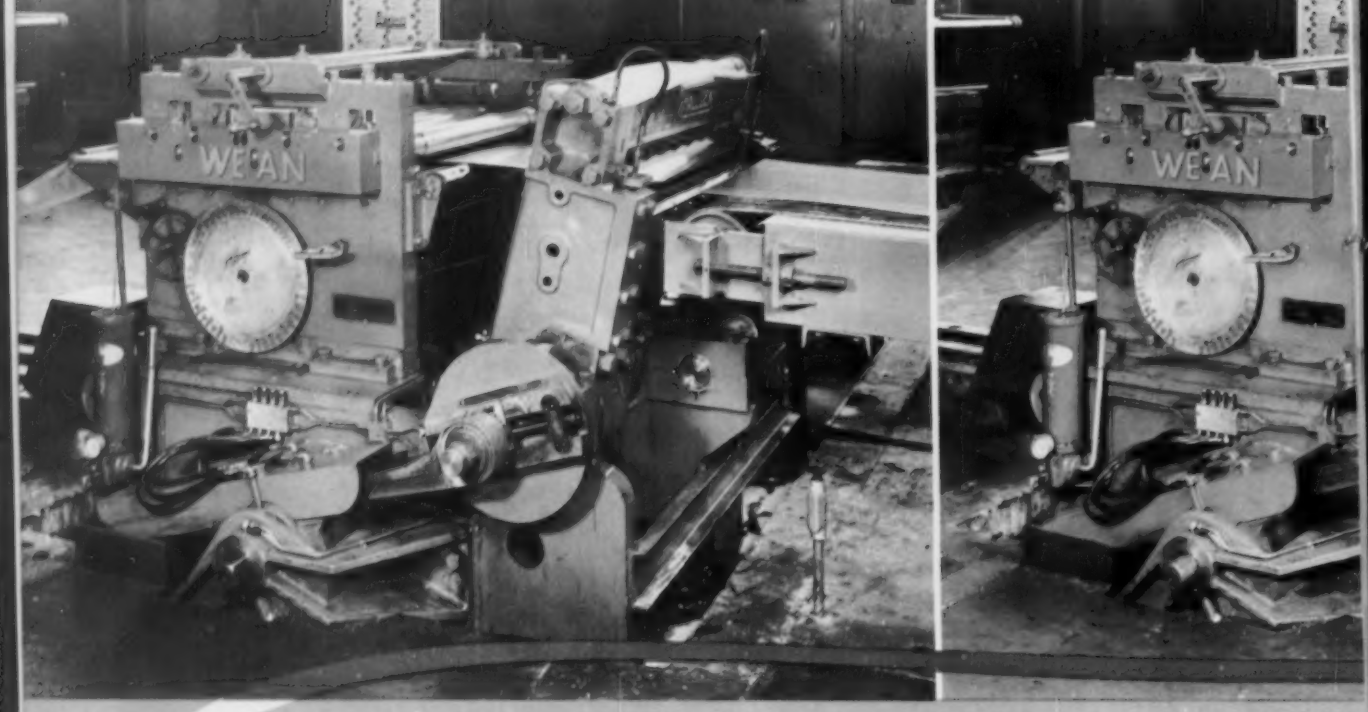
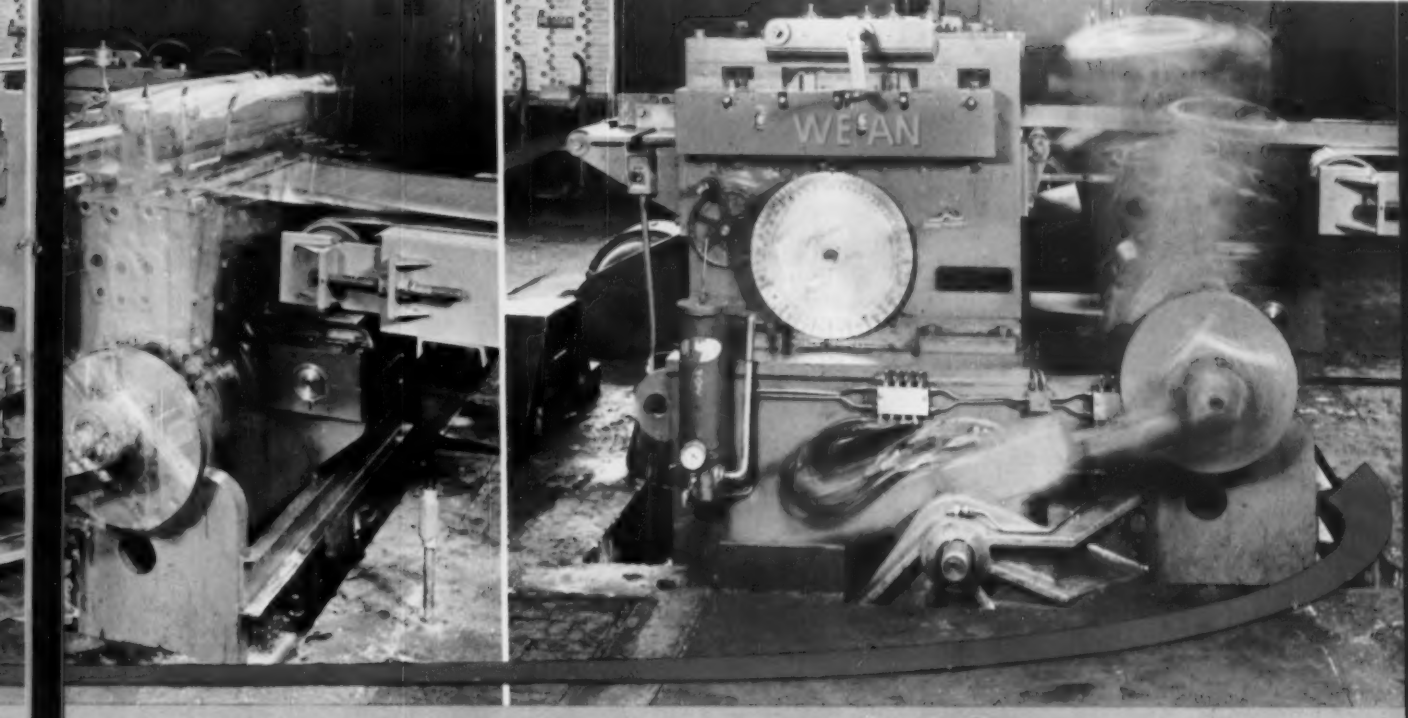
SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - BAR SHAPES - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - RAILROAD TRACK SPIKES - MINE ROOF BOLTS



Here's the Amazing Wean That Makes 100 Cuts Per Minute

Saves Bulk Steel Users $20 a Ton

Wean salesmen have a quick and painless method for actually showing you, using your own figures, how, by purchasing steel in coil form, you can save in the neighborhood of $20 per ton on your steel costs. This is an offer you can't afford to overlook. If your plant is situated in an area where a Wean Line is operating we invite you to see it in operation ... talk with the people who operate it ... and we're sure you'll want this great system in your own plant.



Flying Shear Line
to Resquared Tolerance

One-hundred cuts per minute to resquared tolerances . . . that's what users of the amazing new Wean Equipment Flying Shear and Slitting System are getting. That's why, if you are using steel in sheet form, it's important to you to get all the facts.

By purchasing steel in coil form you minimize the mill extras — that sometimes amount to more than $1.00 per hundred weight. You reduce considerably both the personnel required to handle and inventory large steel stocks and the space needed to store various cut sizes of steel of the same gauge and analysis.

And this Wean System provides you with faster production. Here is a shear line that will cut to tolerance at the rate of 100 times per minute. Measure this against your present squaring-to-multiples rate and you'll quickly see how a single Wean line can keep a bank of high speed presses in constant operation.

SEE IT IN ACTION . . . YOU'LL AGREE

There's no comparison! The Wean Combination Slitting and Shearing Line is absolutely the last word in speed, precision and automatic operation. Before you buy let a Wean Equipment man show you one of these lines in operation. Talk with the operators. You'll be convinced. Simply contact the Wean office nearest you. They're listed below.

Wean

Mark of Distinction

COMBINATION SLITTING and SHEARING SYSTEMS

WEAN EQUIPMENT CORPORATION OFFICES

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To help you find that just-right plant site...

Every day we measure the growth of 2319 communities

in Michigan, Indiana, Ohio, Kentucky, West Virginia, Virginia, Tennessee

THE RESULT . . . a perpetual inventory of plant-site information about a 45,000-square-mile territory abounding in low-cost fuel and power for all types of metal-working industries. This data is unequalled in up-to-the-minute accuracy and completeness.

For nearly fifty years, the American Gas and Electric System has served practically every home and business in this growing seven-great-state area that now includes 2319 towns.

Our men are in these communities every day, every week of the year—a network of on-the-job personnel carefully reporting changes of economic and social import.

Whether your need is dispersion, decentralization or expansion, the American Gas and Electric Company can help simplify your plant-site selection problem. As it has for hundreds of other manufacturers, both large and small, it can bring pertinent information right to your desk ready for measurement by your own yardstick.

You will find that this service will save many hours of valuable executive time in investigation and analysis. There is no charge. All we have to sell is power from capacity sufficient to meet the needs of any industry.

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To get a more detailed description of the many industry advantages in the American Gas and Electric service area, write for the brochure "A 7-State-Plant-Site Trip—in 5 minutes."

You'll learn about water, transportation, labor, taxes, raw materials, education, community character and atmosphere and many other data necessary for pleasant, profitable plant operation. Address your inquiry in confidence to Mr. Lee Davis, Manager Area Development, 30 Church Street, New York 8, New York.

ALUMINUM EXTRUSION TOOLS *demand* FINKL QUALITY

. . . and quality that only 76 years of metal working experience can impart. W4X Hot Work Steel made by Finkl, meets the requirements for aluminum extrusion tools such as mandrels, liners, rams, and adapters. We manufacture containers as well as reworking and relining used containers. Quality control, from steel making in our own melt shop, through forging, heat treating, machining and inspection makes them the finest tools available.

Hot Work Die Steels made by experts cost you no more than those from non-specialists in hot work applications, and in the long run certainly less. When your next requirements for hot work tooling, die blocks, or forgings are being considered, consider Finkl for the best. Our engineers will gladly offer the advantage of their knowledge and our experience. There is no obligation.

DIE BLOCKS
•
HOT WORK STEEL
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•
ELECTRIC FURNACE STEELS

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A. Finkl & Sons Co.

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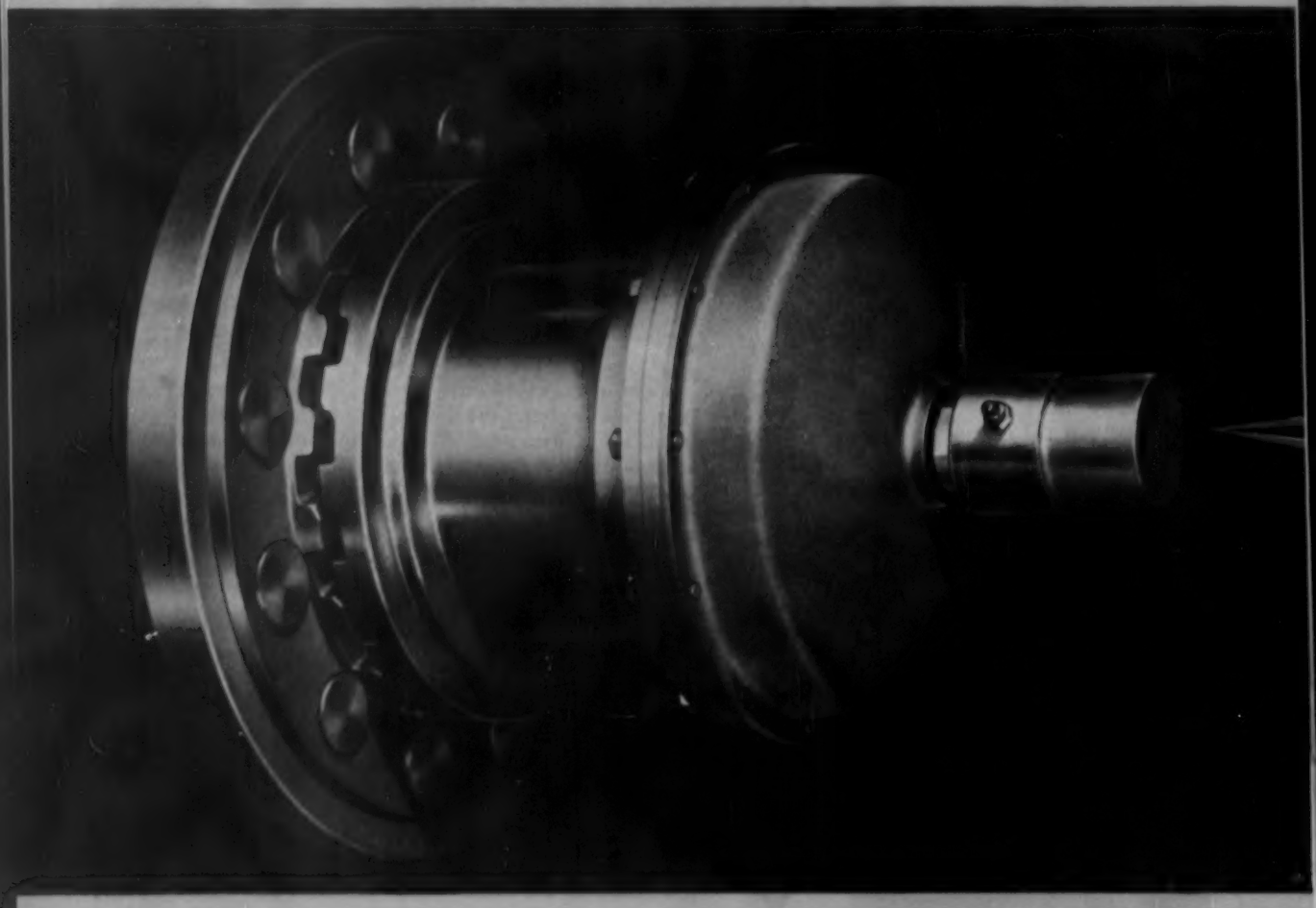
Exclusive NIAGARA Electro-

A prime factor in the operating economy



● Examine it. See it operate. Try it yourself. Compare it point for point. The Niagara Electro-Pneumatic Clutch is distinctly superior in every respect: hourly output ... ruggedness ... simplicity ... safety ... savings in operation and maintenance. *It's functionally different in every major detail!*

There, in a nutshell, you have one of the principal reasons why Niagara presses continually out-perform all others. For fact-loaded details, as applied to single or double crank inclinable, gap frame, horn and deep throat presses, request specific literature and consult with a Niagara representative.

NIAGARA MACHINE & TOOL WORKS · BUFFALO 11, N. Y.

DISTRICT OFFICES:
Buffalo · Cleveland · Detroit · New York · Philadelphia
Dealers in principal U. S. cities and major foreign countries

Pneumatic Clutch

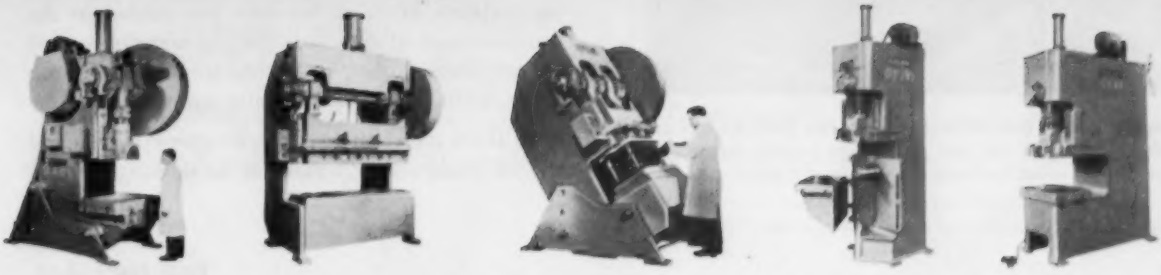
greater output, safety and of Niagara Presses

For Better Performance and Safety

- ENGAGES AND DISENGAGES INSTANTLY at any point in the stroke.
- CAN BE SINGLE-STROKED, JOGGED (forward and in reverse) or operated continuously.
- STOPS INSTANTLY by push button, electric eye, limit switch or similar devices — regardless of crank position.
- PROVIDES EFFORTLESS PRESS OPERATION by palm buttons or foot switch.
- FAILS SAFE. Press stops automatically if electric current or air pressure fails.

For Less Maintenance

- NO FRICTION SURFACES to slip, heat up and wear.
- SIMPLE, COMPACT DESIGN. Nothing to adjust.
- LOW INERTIA. Small in diameter. Operates directly on crankshaft, *the slowest rotating shaft*. No gears nor high speed shafts, etc. to start and stop
- LENGTHENS GEAR LIFE. Wear is distributed uniformly, because engagement load is not always applied to same teeth.
- RUNS IN SEALED BATH OF OIL to minimize wear.
- EASILY ACCESSIBLE. Mounted at end of shaft, external to flywheel.
- NO BUCKING of clutch vs. brake.



America's Most Complete Line of Presses, Shears, Machines and Tools for Plate and Sheet Metal Work

REPUBLIC BOXES and simplify parts handling

Republic Boxes and Skids are used on the production line at Toledo Scale. Parts are moved from one machining operation to another quickly and easily by lift truck or hand-operated units.

Finished parts are stored in neat areas like this. Boxes are labeled with part numbers. Box and skid design permits easy visual inspection for inventory checks. Fits in nicely with other-type units.

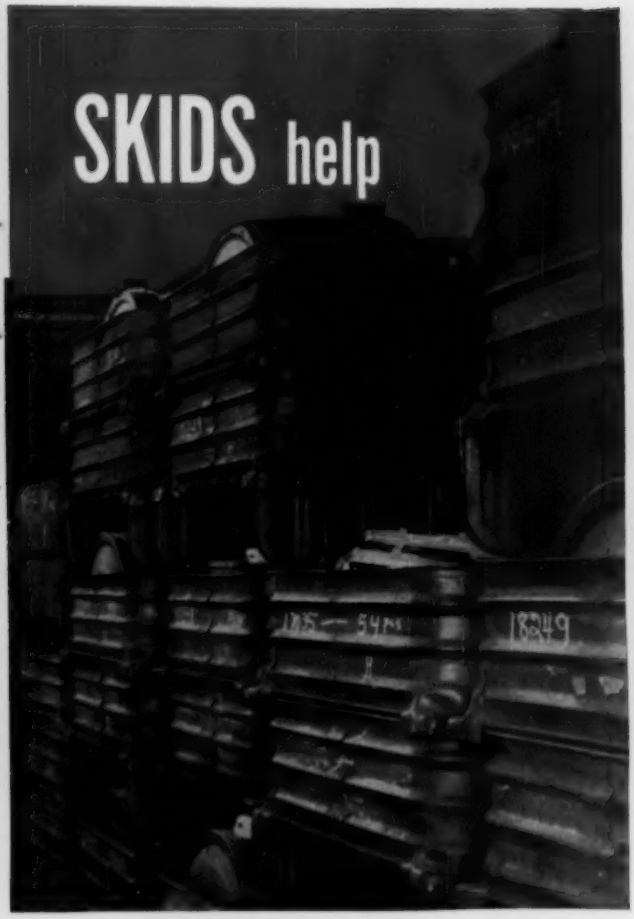
...provide Toledo Scale with keep everything

Neat, wide, uncluttered aisles are typical of the Toledo Scale Company plant at Toledo, Ohio. Republic Steel Box and Skid Units are used at practically every stage of production, from receiving to shipping.

For example, keeping track of and handling the thousands of parts needed for the products manufactured by Toledo Scale could be a difficult job. But, the company does it efficiently and at low cost with the help of Republic PB-130 Box and Skid Units.

These units are specifically designed for stacking. Box capacity can be varied by adding or removing ring sections. Stacking brackets are welded to the bottom corners of each box. Tiering lugs are welded to some boxes so that, when they are used as the top section, additional complete units can be tiered.

The skids are equipped with bumper-type channel runners. These are arc welded to the skid legs adding



a place for everything— in its place

strength to the sides and protecting skid ends and floor surfaces.

The PB-130 is only one of many types of box and skid units manufactured by Republic's Pressed Steel Division. There is a wide range of sizes from which to choose. Or if you have a special handling problem, Republic engineers are available to help you design a unit to meet your individual requirements. The coupon will bring you more facts by return mail.

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

SIMPLIFY WEIGHT PROBLEMS WITHOUT LOSS OF VITAL STRENGTH. The high strength-to-weight ratio of Republic Alloy Steels permits smaller sections to carry heavier loads safely, like the gears and shafts of this huge power shovel. Vital parts are tough—resist shock, impact, vibration. Republic metallurgists will help you select the proper analysis for your product.

SIMPLIFY YOUR FLAT ROLLED STEEL PROBLEMS. Republic produces a wide line of flat rolled products including hot and cold rolled sheets and strip, galvanized, galvannealed, electro-zinc-plated, silicon steels and many others. The world's widest strip mill—98 inches—operated by Republic, produces steel wide enough for one-piece auto tops.

SIMPLIFY YOUR FASTENER BUYING. Republic's Bolt and Nut Division makes more than 20,000 regular types and sizes of headed and threaded products—over 8,000 specials. Everything from machine bolts to "Nylok" Nuts and high-strength bolts. You can depend on Republic Fasteners for quality, ease of application, uniformity, long service life. Quick delivery, too.

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Please send more information on:

☐ Materials Handling Equipment ☐ Alloy Steels
☐ Sheets ☐ Fasteners

Name_____ Title_____

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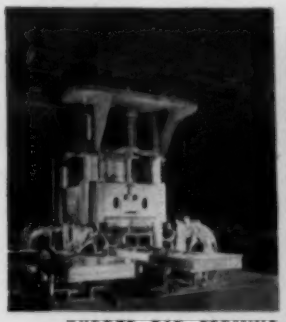
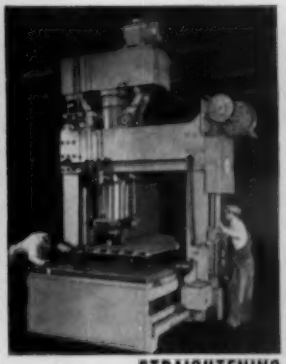
DRAWING

From a single press to a packaged installation . . .

PACKAGED INSTALLATIONS



RUBBER PAD FORMING

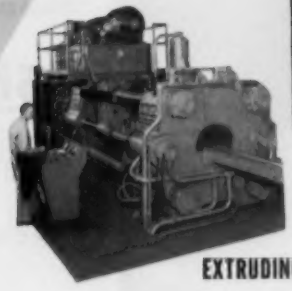


STRAIGHTENING

FORMING

PLATE BENDING

BULLDOZING



EXTRUDING

LAKE ERIE MAKES THEM ALL

More than 3,500 developed designs of hydraulic presses to meet every pressing requirement are immediately available to you at Lake Erie. Make it a practice to consult Lake Erie about your hydraulic press needs.

(Leasing and deferred payment plans tailored to your exact needs.)

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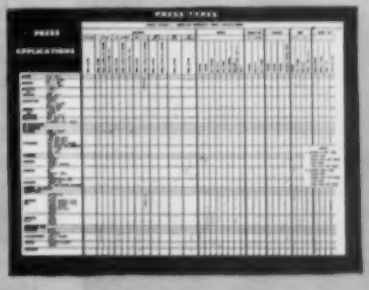

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EXTRUSION PRESSES • DIE CASTING MACHINES
ROLLING MILL AUXILIARY EQUIPMENT

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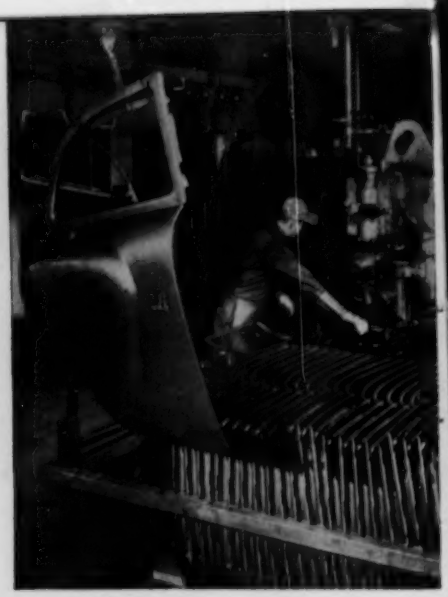
LAKE ERIE®

Sheet Steel is fed into a blanking press and sheared to fender outline.



Smoothly Contoured door panels, each shaped from a sheet of steel, move steadily on conveyors.

Eight-n-Minute—Steel sheets are deep drawn to fender contours in this huge, 450-ton double acting ram press where the cold steel flows evenly under tremendous pressure.

Shapeliness The New Gives

When you look at the low, smooth-flowing lines of today's automobiles and admire their graceful styling, do you ever wonder how steel becomes so shapely?

The appeal of an automobile's design is far more than just the dream of a designer worked out from the artistic sketches and mock-up models he creates. It is the translation of his clay models by engineers and production men into practical contoured curves of steel sheet.

In the early days, the designer was limited by what steel could do and restricted by his own production equipment.

Today, automation has improved and speeded production. The techniques for making steel have advanced apace. Automakers can draw on the resources of technical know-how and steelmaking facilities equipped with the latest in technological controls, such as the new rolling mills at Pittsburgh Steel Company, for producing hot and cold rolled steel sheet.

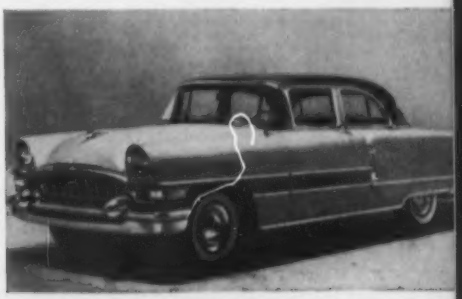
So today the designer's range of ideas is becoming increasingly unlimited because better production and new quality in steel are giving

(Advertisement)

Complex Automatic equipment assembles inner and outer door panel where automation speeds production.

Assembled Doors, solidly constructed, yet gracefully styled, are ground and polished for perfect surface.

Fashion In Steel Quality Designers Vast Horizons



In the Showroom and on the road, designer's creation becomes a beautifully practical reality of steel shapeliness.

him ever-widening horizons for the creation of practical new designs. At Pittsburgh Steel this new quality in steel is called shapeliness.

• **What Is It?**—Shapeliness is the ability of steel to be drawn under tremendous pressure to the severest contours of design, while retaining its strength and giving a consistently smooth surface. Beyond that, it must maintain this quality uniformly in sheet after sheet and coil after coil to provide smooth, trouble-free performance on high-speed production lines.

You will quickly grasp the importance of this quality if you will take a look at today's production of sleekly-designed fenders and doors for beautiful new automobile styles.

The sheet from Pittsburgh Steel to provide these shapes has the necessary internal qualities: exact chemical analysis, cleanliness, and fine grain size. And it has the most desired external qualities: uniform dimensional accuracy and surface cleanliness.

It must have these qualifications throughout each sheet and from sheet to sheet as it is fed into powerful, high-speed press operations in order to minimize the possibility of grainy surface, buckles, wrinkles, tears, stretcher strains, or skin breaks.

It is shapeliness, then, that assures a snug-fitting door or fender with a clean, smooth surface for painting . . . one that is attractive on the showroom floor and a stand-out on the road.

• **How It Pays**—Not every steelmaker can produce this quality of shapeliness in steel with the same success. Some, by reason of new equipment and technical experience, can meet the manufacturers' requirements more consistently than others.

If the production of your products requires better than average quality sheet steel, why not explore the opportunities Pittsburgh Steel offers you? Your orders will get personal attention from the time they are entered on the books until your product is completed. A phone call today to the district office nearest you may prove worthwhile.

"Everything New But The Name"

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

DISTRICT SALES OFFICES: Atlanta • Chicago • Cleveland • Columbus • Dallas Dayton • Detroit • Houston • Los Angeles • New York • Philadelphia • Pittsburgh San Francisco • Tulsa • Warren, Ohio. PLANTS: Monessen, Pa. • Allenport, Pa. Akron • Los Angeles • Unionville, Conn. • Warren, Ohio • Worcester, Mass.

Write for your copy of the color brochure "The New Pittsburgh Steel Company."

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wanted:

uninterrupted stamping production

More finished stampings per shift at lower cost is the final test of a new press line . . . to meet this test, production men concentrate on fast, *uninterrupted* production from one end of the line to the other. Every press is a vital station, every operation is critical in keeping the line running as a mass production unit.

That's why you find more and more new stamping lines made up completely of Danly Presses. You will find many reasons. Danly Presses are known for their extra rugged construction to withstand the stresses of continuous operation at full capacity; exclusive control arrangements facilitate automation; maintenance needs are decreased by automatic *oil* lubrication.

There's a great deal more to the Danly Press story, too — design and construction features that will make Danly Presses a must on your new line. Call a Danly engineer for a detailed discussion now.

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2100 South Laramie Avenue, Chicago 50, Illinois

DANLY

specify:

complete lines of NEW DANLY PRESSES

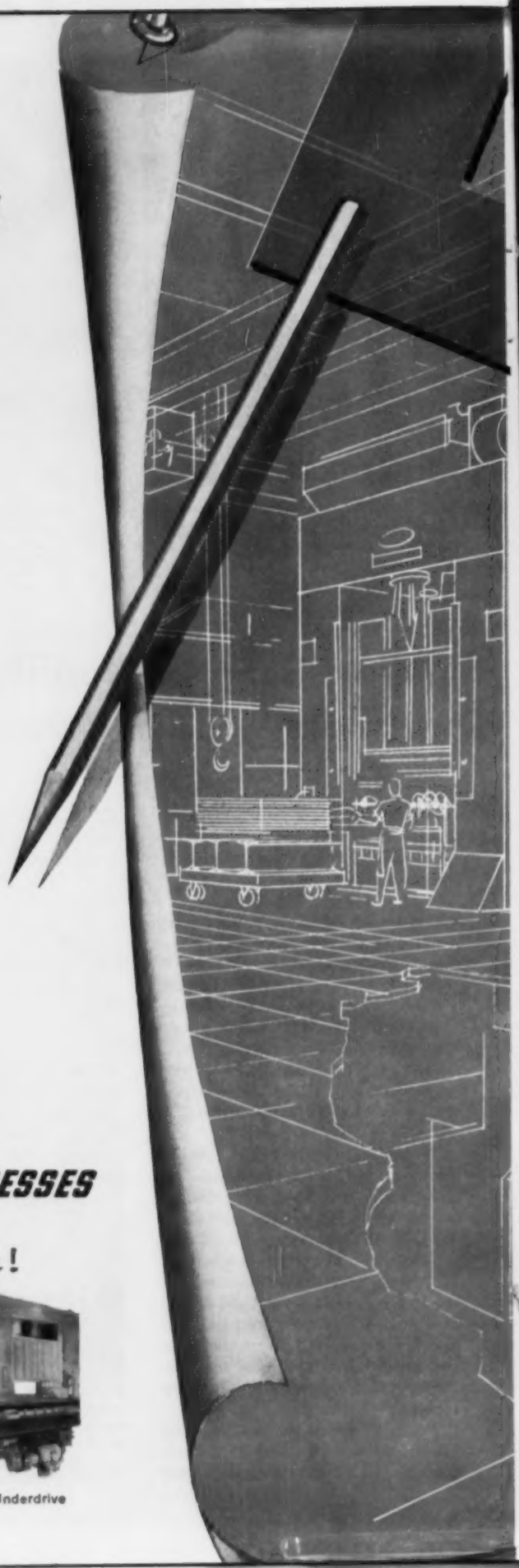
It costs less to run a DANLY PRESS line!

Single Action Straight Side

Autofeed

Double Action Straight Side

Underdrive



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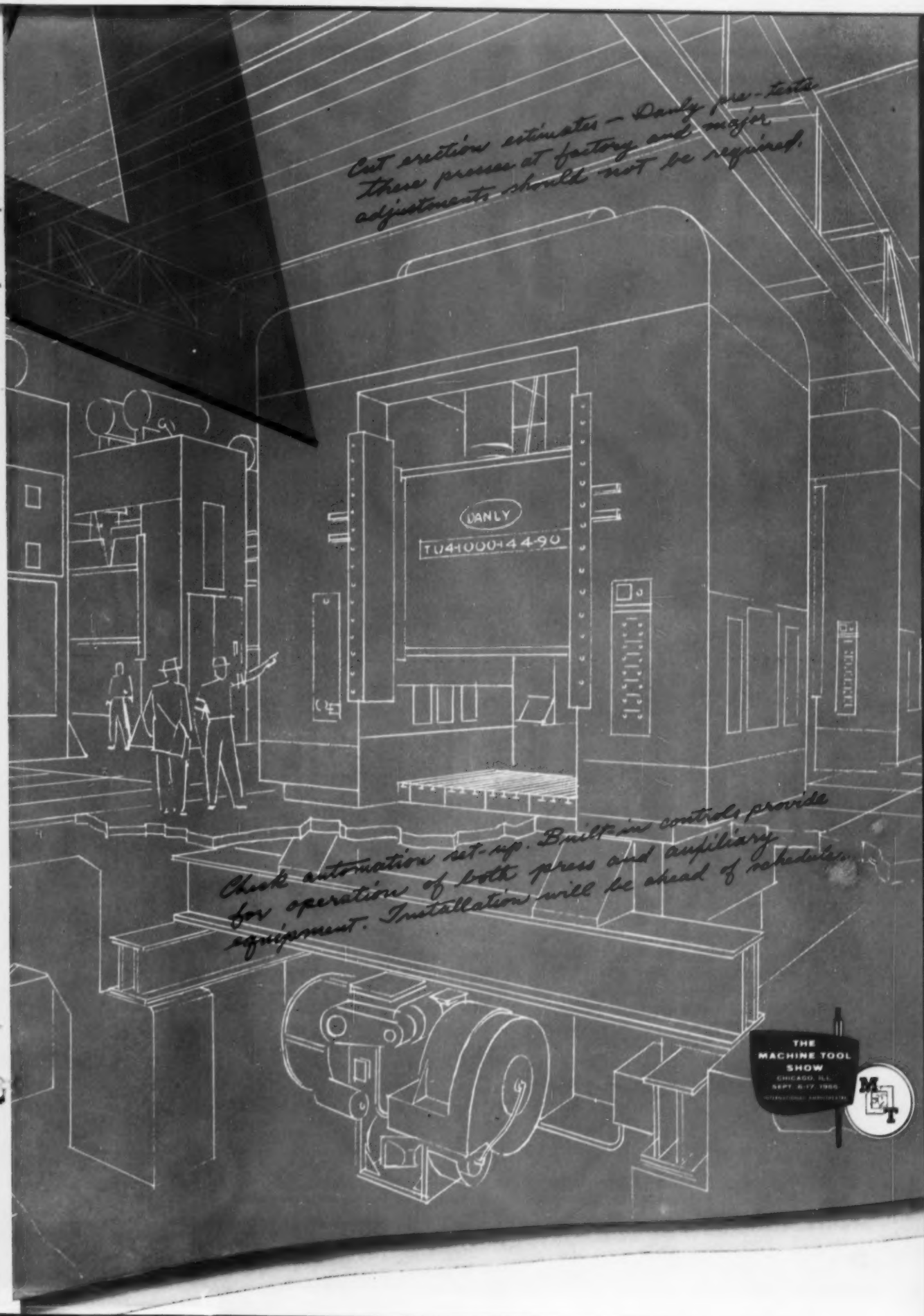
Cut erection estimates – Danly pre-tests these presses at factory and major adjustments should not be required.
DANLY
TU4100044490
Check automation set-up. Built-in controls provide for operation of both press and auxiliary equipment. Installation will be ahead of schedule.
THE MACHINE TOOL SHOW
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Since different fire hazards require different types of fire extinguishers, PYRENE—C-O-TWO manufactures all types . . . the finest and most complete line on the market today.

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COMPLETE FIRE PROTECTION

portable fire extinguishers . . . built-in fire detecting and fire extinguishing systems

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One out of five is a full time inspector

. . . to keep TIMKEN® stainless steel forging bars uniform

ONE out of every five of the people who make Timken® stainless steel forging bars is a full time inspector. These men check every order for everything from the chemical composition of the melt to grain size after heat treatment. In fact, they make 60 chemical checks alone of every heat of steel that goes into Timken stainless steel forging bars.

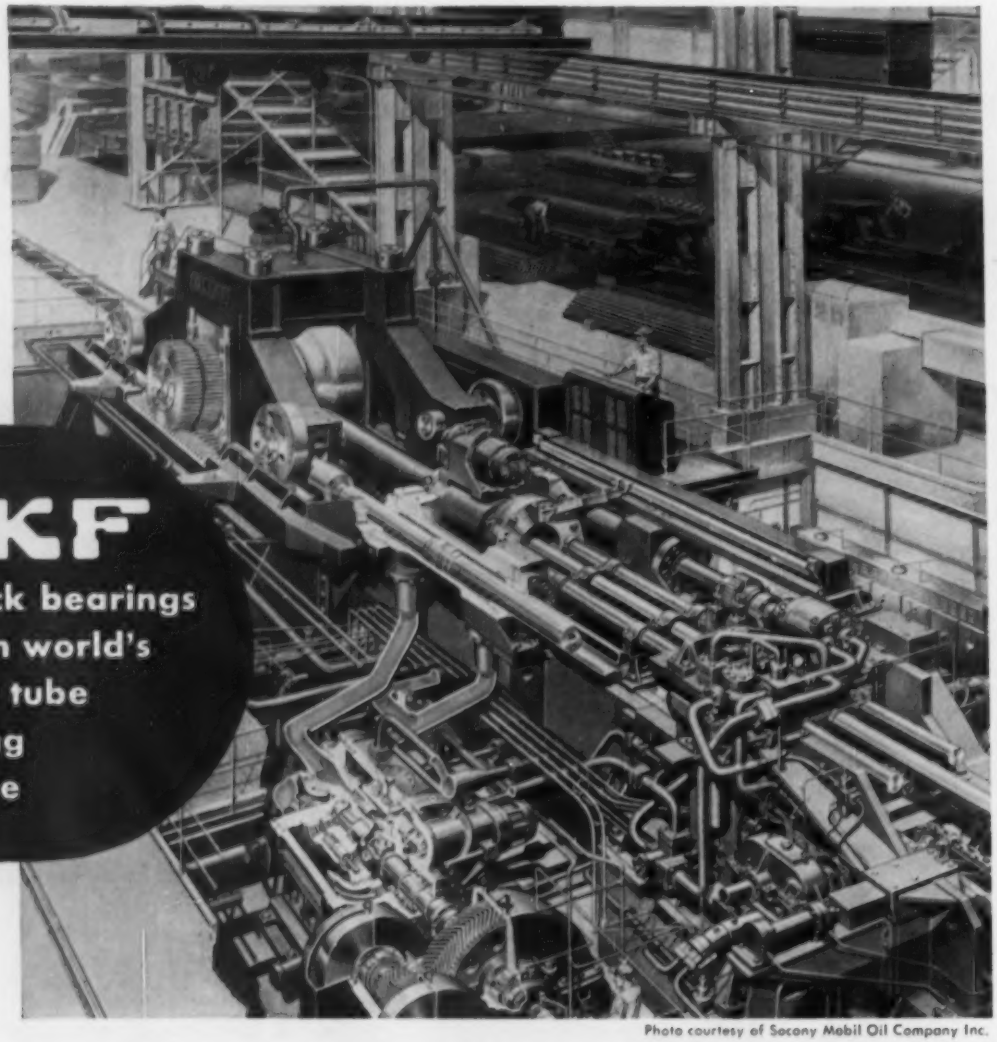
This is one reason why Timken stainless steel forging bars have no variation within any order—have no variation from order to order. They have uniform physical properties, respond uniformly to heat treatment, have uniform grain size after heat treatment and have good dimensional tolerances.

You'll find that Timken stainless steel forging bars hold your rejects to a minimum, require fewer furnace adjustments and have uniformly high ductility and resistance to impact.

Our technical staff will help you choose the correct analysis of Timken stainless steel forging bars for your requirements. And our production department will make sure you get your order on time. For more information, write for your free copies of our technical bulletins on stainless forging steels. Address: The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING



SKF

roll neck bearings used on world's largest tube reducing machine

Photo courtesy of Socony Mobil Oil Company Inc.

SKF sphericals absorb tremendous punishment, provide greater bearing capacity

This 102 foot long giant tube reducing machine, designed and operated by Tube Reducing Corporation, Wallington, N. J., for the U. S. Navy Bureau of Aeronautics, and built by E. W. Bliss Company, Canton, Ohio, puts a 3½ million pound squeeze on precision tubing of outer diameter sizes ranging from 9 to 17 inches for military and commercial cold finished tubular products.

The mammoth bearings for 50" diameter rolls on the machine are SKF Spherical Roller Bearings. They are the largest spherical roller bearings of this type ever made, with a rated capacity of 3,200,000 lbs. Each bearing weighs 5150 lbs.; individual rollers weigh 39½ lbs.

The Tube Reducing Corporation first employed SKF Spherical Roller Bearings in 1937 for a 2¼" tube reducing machine having 13" diameter rolls. Today, *all* tube reducers in this plant are SKF-equipped... from the smallest to the 102 foot giant.

Like the men at Tube Reducing Corporation, organizations that pioneer advancements in their fields are accustomed to find that SKF matches their vision with advanced bearing design that helps them make a working reality of their most ambitious and forward-looking plans.

Make SKF Engineering cooperation a *plus* factor in the successful realization of your company's planning and development program. 7651

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA., *manufacturers of* SKF *and* HESS-BRIGHT® *bearings.*

SKF®

BALL AND ROLLER BEARINGS

Dragonfly
ANAX JUNIUS

Lightweight

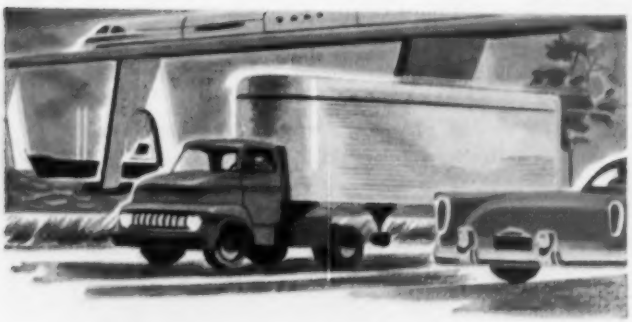
In the world of insects, the Dragonfly (also known as the "devil's darning needle") ranks high for lightweight insofar as size is concerned. It is one of the most active members of the insect kingdom.

This creature can remain almost constantly in the air, flashing forward and backward. It can remain poised in a fixed position and then dart faster than the eye can follow—only to reappear in almost the same spot.

In the world of materials, aluminum is one of the lightest of metals. Aluminum weighs one-quarter to one-third as much as other commercial metals. With proper design, aluminum can cumulate direct weight savings and multiply them many times—as much as ten times in the structure of aircraft. Compared on an equal weight basis with traditional metals, aluminum can give several times the number of parts per pound.

Because rotating and reciprocating parts made of aluminum are light in weight, their inertia forces are low; braking and accelerating forces also are less than with heavier materials.

Aluminium Limited Sales, Inc. is distributor in the United States for aluminum from Canada. Why not investigate making your products of aluminum?



Lightweight

In the construction of Automobiles, Trucks and Trailers, Ships, Trains, Drums and Barrels, aluminum is put to more new uses than any other metal. Lightweight aluminum means extra payloads and more economical operation.

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Aluminum *from* Canada

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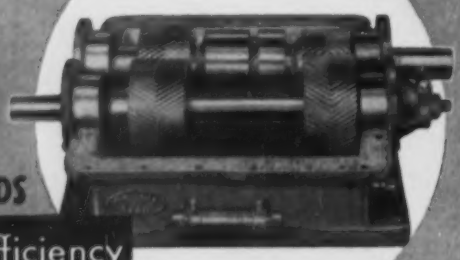
a "standardized" line

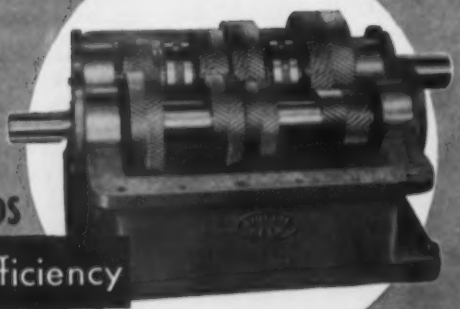
GEARED, SELECTIVE TYPE

CHANGE SPEED UNITS



2 SPEEDS
97% efficiency

3 SPEEDS
96% efficiency



4 SPEEDS
95% efficiency

The Philadelphia self-contained, compact all geared type Speed Change Units are available in 2, 3 and 4 speed changes, providing definite ratios of Speed Reduction, Speed Increasing (or a combination of both). Speed changes are accomplished by just the "*mere* turn of a control lever."

These exclusive units were designed to fill Industry's need for a highly efficient, precision-built standardized line . . . to eliminate the high cost and delayed deliveries of specially designed units.

Gear specifications: All gears and pinions are Sykes Continuous Tooth Herringbone type, precision cut of involute shape, carefully heat treated and finished, and designed for maximum tooth contact and overlap.

All component parts and materials in these unusual Units are of highest quality and workmanship: Housings, Shafts, Bearings, Clutches, Lubrication Systems, etc.

Ratings are according to AGMA recommendations for continuous service, with allowance for 100% overload in starting and for momentary shock loads . . . shafts and bearings are of proper size to permit heavy overhung loads resulting from use of sprockets or pulleys.

Be convinced, write for 24 page illustrated catalog #CSU-52.

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ERIE AVE. AND G ST., PHILADELPHIA 34, PA.
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Virginia Gear & Machine Corp., Lynchburg, Va.

Industrial Gears & Speed Reducers

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ESTABLISHED 1892

ANNOUNCING...

the Beryllium Copper ROLLPIN®

Strong . . . highly resistant to corrosion . . . nonmagnetic . . . extremely conductive

Now you can use Rollpin to cut assembly and maintenance costs in a whole new group of applications. A new line made of beryllium copper, one of the strongest of the copper base alloys, opens the door to a wide variety of uses where resistance to corrosive attack, good electrical properties and other unusual characteristics are required. These slotted tubular copper spring-pins can be used in assemblies that range from plumbing fixtures to electrical instruments, particularly in conjunction with other copper base alloy components.

Rollpin has already established its ability to replace taper pins, straight pins and set screws; to serve as a rivet, dowel, hinge pin, cotter pin or stop pin . . . eliminating special machining, tapping and the need for hole reaming or precision tolerances. Driven into a hole drilled to normal production standards, it locks securely in place, yet can be readily drifted out and reused whenever necessary.

Rollpin is available in beryllium copper from .062″-diameter to .250″-diameter, and in steel and stainless steel up to .500″-diameter.

ELASTIC STOP NUT (ESNA) **CORPORATION OF AMERICA**

Dept. R35-677, Elastic Stop Nut Corporation of America
2330 Vauxhall Road, Union, New Jersey

Please send me the following free fastening information:

☐ Data on beryllium copper Rollpin

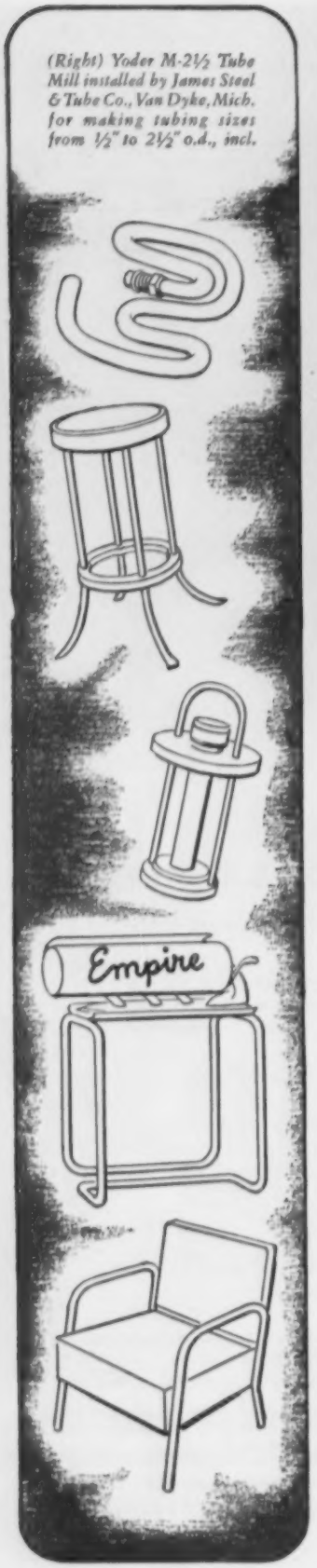
☐ Here is a drawing of our product. What self-locking fastener would you suggest?

Name_____ Title_____

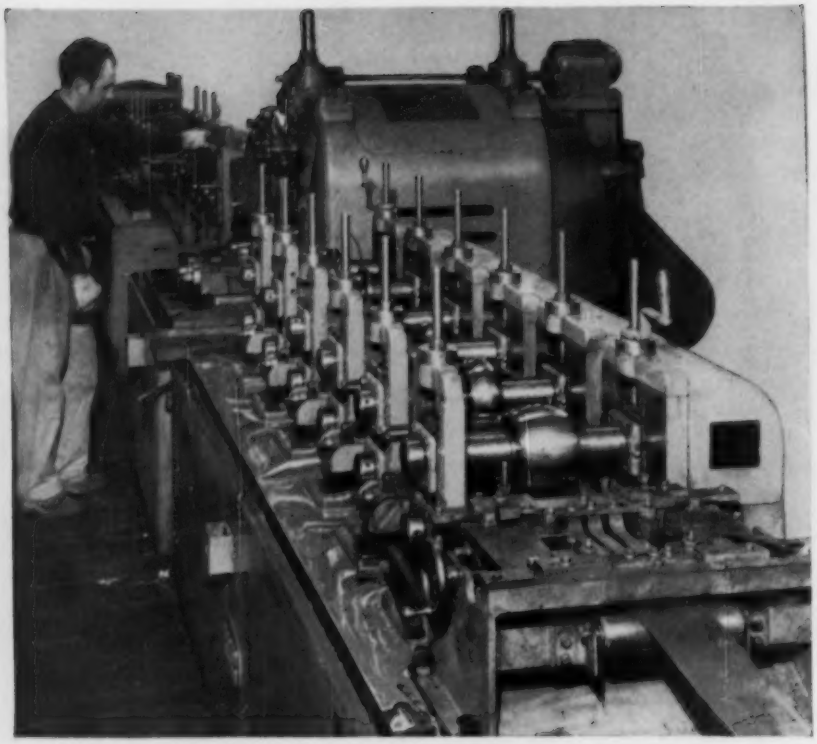
Firm_____

Street_____

City_____ Zone_____ State_____



(Right) Yoder M-2½ Tube Mill installed by James Steel & Tube Co., Van Dyke, Mich. for making tubing sizes from ½" to 2½" o.d., incl.



Plain Facts about

ELECTRIC-WELD TUBE MANUFACTURE

In tube making everybody wants the highest possible speed consistent with good, strong welds and dimensional accuracy. There are, in addition, at least three more essentials to profitable tube making, namely:

1. Low scrap losses—because cost per foot of strip metal is many times greater than the conversion cost.
2. Fine exterior finish, free from scratches, scuff marks and other irregularities which limit usefulness and lower salability.
3. Quick and easy mounting and adjustment of tooling, to reduce time losses between successive production runs.

Yoder tube mills excel in all these respects and have other mechanical, electrical and economic advantages. Because Yoder tube mill owners have found from experience their performance is as good as our promise, there are more Yoder mills sold and in operation than all other electric-weld mills combined. This is as true today as it was ten years ago.

If you want the plain facts about the things to look for in a tube mill, to insure most profitable operation over the years, the new Yoder Tube Mill Book will give them to you, in the simplest language and with numerous illustrations.

A copy is yours for the asking.

THE YODER COMPANY
5510 Walworth Avenue, Cleveland 2, Ohio

ELECTRIC-WELD TUBE MILLS • SLITTING LINES
COLD ROLL FORMING PRODUCTION LINES

ENGINEERING YODER MANUFACTURING

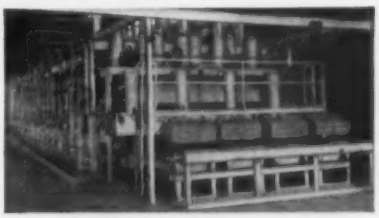
How to Select the Most Economical Insulating Firebrick

The advantages of lightweight insulating firebrick over ordinary "heavyweight" firebrick are generally known to furnace operators and furnace builders. But many buyers have wondered just what advantages there might be in one brand of insulating firebrick as against another. The answer to this question could very well mean savings in fuel costs, increased furnace output, longer life . . . or all three.

One furnace builder ran tests on their small electric kilns where heat input could be measured with great accuracy. Here's what they found: B&W IFB required 25% less heat than any other brand of insulating firebrick they tried.

The reason? B&W IFB are lighter in weight than any other insulating firebrick — they contain more tiny, insulating air cells. Heavier, denser insulating firebrick linings waste fuel two ways: They soak up and store more heat which is lost when the furnace is cooled; and they conduct more heat through the walls.

How about long life? One of the

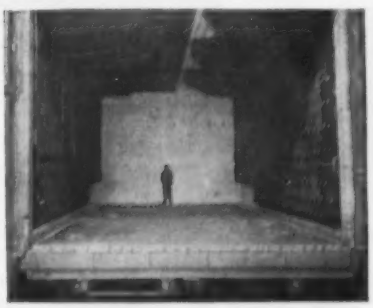


toughest tests of firebrick is in the lining of a carbon monoxide furnace. Some brands last only a few weeks, then disintegrate, due to iron oxide impurities in the brick which react with the gas.

But B&W Insulating Firebrick contain little iron oxide, and they're processed at high temperatures so that any traces of iron oxide form stable compounds. So instead of deteriorating they stay on the job year after year —in many cases over 10 years.

Another factor, important to many furnace operators, is accurate temperature control. Here again B&W IFB have an advantage over other insulating firebrick. First, because B&W IFB are lighter in weight they store and conduct less heat—and they respond more quickly to changes in heat input.

A typical example is the giant stress-relieving furnace shown below—sixty feet by twenty-two feet by seventeen feet high. The B&W lining plays a vital part in holding the desired temperature within 5 degrees accuracy!



Next time you buy or specify insulating firebrick, remember that the lightest weight brick of all—B&W—has the highest insulation value, the longest life and the greatest furnace heat controllability.

THE BABCOCK & WILCOX CO.
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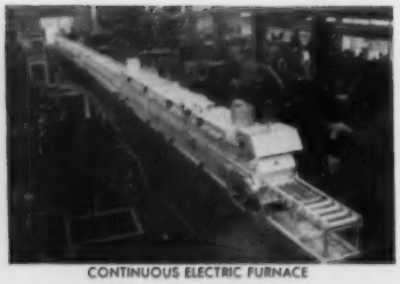
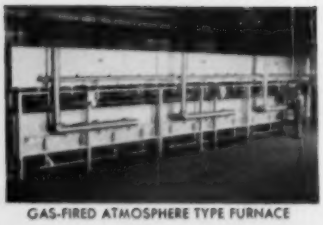
(Advertisement)

B-918

AUTOMATIC ROLLER GRID FURNACE



CONTINUOUS ELECTRIC FURNACE

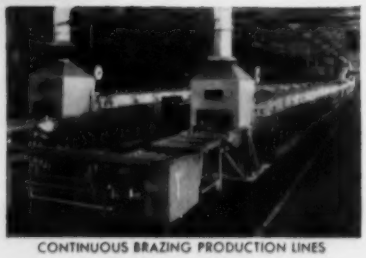


GAS-FIRED ATMOSPHERE TYPE FURNACE

BIG ONES

AUTOMATIC ROTARY HEARTH FURNACE

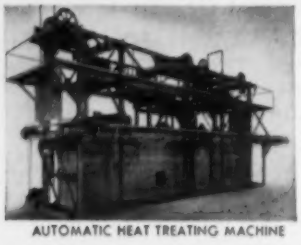
ALUMINUM BILLET HEATER



CONTINUOUS BRAZING PRODUCTION LINES

CONTINUOUS ROTARY RETORT FURNACE

CONTINUOUS CONVEYOR FURNACE



AUTOMATIC HEAT TREATING MACHINE

CONTINUOUS VITREOUS ENAMELING LINE

. . . all field-erected by Lindberg

Maybe you haven't heard the news. Lindberg is now set up to field-erect any type of industrial heating or processing installation. Here are just a few of the large field-erected installations already put up by Lindberg. More are being built right now.

You get a complete package deal from Lindberg. Expert engineers consult with you and analyze your needs. Then they plan and design an installation to meet your specific requirements, whether you need a single furnace or a complete production line. And Lindberg will build it for you, right in your own plant.

To get on-the-spot service from an expert Lindberg engineer, just call your nearest Lindberg Field Office (you'll find the number in the classified section of your phone book, or in the Trade Directories).

LINDBERG INDUSTRIAL

LINDBERG INDUSTRIAL CORPORATION

Chicago Plant: 2321 West Hubbard Street, Chicago, Illinois

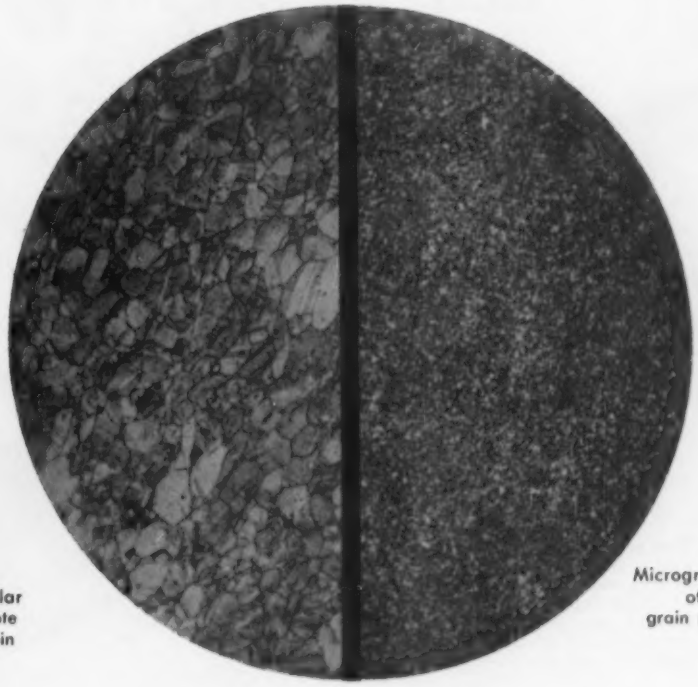
Field Offices in principal cities.

Los Angeles Plant: 11937 Regentview Avenue, at Downey, California

Associate Companies: Lindberg Engineering Company, Chicago • EFCO-Lindberg, Ltd., Montreal • Lindberg Italiana, Milan, Italy

Get longer life in formed parts AT NO EXTRA COST

USE THE NEW FINE GRAIN PHOSPHOR BRONZE WITH 30% GREATER ENDURANCE LIMIT



Micrograph (75x magnification) of regular phosphor bronze. Note relatively coarse grain structure.

Micrograph (75x magnification) of Duraflex. Its fine grain structure is the secret of its superiority.

DURAFLEX*

BY ANACONDA

DURAFLEX is a new, fine-grain phosphor bronze developed and sold only by Anaconda. Comparative fatigue tests show that the endurance limit of DURAFLEX is approximately 30% higher than for regular phosphor bronzes. In surface appearance, surface smoothness and hardness, it is superior to other phosphor bronzes. It is unsurpassed in corrosion resistance by any other phosphor bronze. Further, its formability is increased with no sacrifice in yield strength. DURAFLEX is a *premium* phosphor bronze in every way except cost; there's *no increase in price.*

If you're now using a hard-temper phosphor bronze, chances are that you can do the same forming in extra-hard temper DURAFLEX.

If you're looking for longer life in the parts you form, we'll be glad to send you a free sample of DURAFLEX. Try it, test it, and you will agree that it is superior.

*Trade Mark

SEE FOR YOURSELF—

AN

ANACONDA®

PRODUCT

MADE BY THE AMERICAN BRASS COMPANY

FREE SAMPLE

The American Brass Company, Waterbury 20, Conn.

(In Canada: Anaconda American Brass Ltd., New Toronto, Ontario)

Yes, we'd like to try DURAFLEX. Please send us a free sample of

sheet in_____ temper, _____ thick,

wire in_____ temper, _____ diameter.

☐ **We'd like to talk to one of your representatives about DURAFLEX.**

NAME . . . . . .

COMPANY . . . . . .

STREET . . . . . .

CITY . . . . . STATE . . . . . .

SHEET . . . up to 0.062" thick
WIRE . . . up to 3/16" diameter (approx.)

F.O.P.

by the Mullins *Koldflo** Process

This one-piece, 2¼" O. D. torsion tube used in tandem axles has a surface finish of better than 60 RMS both inside and outside, with concentricity held to .020 inches maximum. The inside offset at the open end of this tube is formed cold, to finished size, with no machining.

MULLINS *Koldflo* steel extrusions are F.O.P. ... *Finished On Presses* to a surface finish of 60 RMS or better. In case after case, these cold extrusions meet specified tolerances and surface requirements as produced, eliminating the finish machining or grinding required on parts produced by conventional methods.

Too, you can forget many of the design limitations of conventional methods when you design for *Koldflo*. We can produce precision cylinders with integral ends, incorporating many details impractical with other methods ... all in a one-piece design. Mullins *Koldflo* steel extrusions can be furnished in a variety of shapes and sizes and with a choice of mechanical properties.

If you require precision cylindrical steel parts in high volume, give us your specifications, and quantity required ... We'll be glad to show you how *Koldflo* can turn your new designs into new and better products.

"How Would You Tool-Up To Make An Egg?"

For copy of new and expanded booklet, write Koldflo Division, Dept. A-6, Mullins Manufacturing Corporation, Warren, Ohio.

*Trade Mark Reg. U. S. Pat. Off.

Koldflo

DIVISION

MULLINS MANUFACTURING CORPORATION

Warren, Ohio

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WON'T BREAK DOWN

under continued high heat!

HOUGHTON ACITROL

the dependable pickling inhibitor

ACITROL requires no pre-mixing—it is readily soluble at all times—and is available in foaming or non-foaming types.

- Full protection for high and low carbon steels or alloys
- Lower cost per ton of steel processed
- Produces a clean, bright finish
- Effective at full range of bath temperatures

There's much more to the big ACITROL story, and your Houghton Man is the one to tell it. Or get more detailed information from E. F. Houghton & Co., 303 West Lehigh Avenue, Philadelphia 33, Pa.

ACITROL

. . . a product of

E. F. HOUGHTON & CO.
PHILADELPHIA · CHICAGO · DETROIT · SAN FRANCISCO

Ready to give you on-the-job service . . .

Three Types of Kirksite melting pots produced in long-wearing nickel alloyed cast iron which is resistant to the moderately elevated temperatures encountered. Made by Apex Steel Corp., Ltd., a specialist in producing pots used for melting non-ferrous alloys.

Melting Pots that last for years

Read how nickel chromium cast iron increases service life

HERETOFORE pots used for melting Kirksite (a zinc base alloy) went bad in a matter of months. Thermal checking and corrosive action of the molten alloy caused the most failures.

Today, however, use of nickel chromium cast iron has increased the life of these melting pots by 300 to 400 per cent. Depending upon heat cycle and severity of the service.

Now, two or three years life is common. And under optimum conditions their life is even longer.

This great improvement stems from experiments made by the Foundry and Machine Division of Apex Steel Corporation, Ltd., Los Angeles, California, together with INCO.

After trying various alloyed compositions, results obtained jointly by these companies show the correctness of standardizing on nickel chromium cast iron.

If you have a metal problem . . . whatever the troublesome factors involved . . . lets talk it over. Draw on our vast fund of useful information. Take the first step now . .

Write for "List A" of INCO publications. With it comes a simple form for outlining your difficulties. We'll be glad to send you suggestions based on our wide practical experience. Write us today.

INCO TRADE MARK

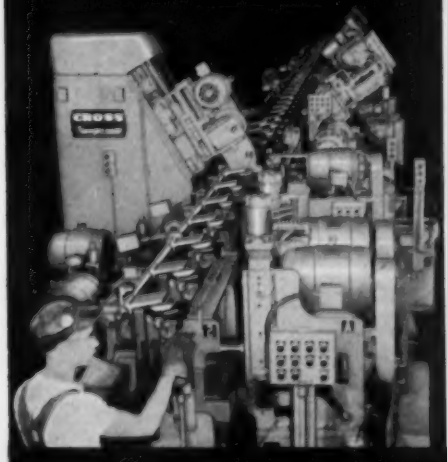
THE INTERNATIONAL NICKEL COMPANY, INC. 67 Wall Street New York 5, N.Y.

Warner Gear Reduces Downtime with Cross Machine Control Unit

A Mechanical Eye...

(U.S. Patent Nos. 2679038 and D-163935 Others Pending.)

At right, set-up man pre-sets tools at Warner Gear Division, Borg-Warner Corp. for Transfer-matic below.



"We are well satisfied with the results we have obtained from the Cross Machine Control Unit," says Emory Watson, Master Mechanic of Warner Gear Division of Borg-Warner Corporation.

Warner Gear's experience is typical of many users. Over 500 Cross Machine Control Units are successfully reducing costs of many metal cutting operations. Here's why:

Toolometers on the Machine Control Unit assure improved tool changing programs and maximum tool efficiency. Tools—pre-set with standard fixtures and gages to eliminate machine adjustments and trial cuts—are stored in the Machine Control Unit convenient and ready when needed. Results: Reduced tool costs . . . less downtime . . . higher operating efficiency.

You can get the same cost saving benefits as Warner Gear. Write, wire or phone The Cross Company for full information, today.

Established 1898

THE CROSS CO.

DETROIT 7, MICHIGAN

Special MACHINE TOOLS

WE FILTER OUT THE IRRITANTS
Spring
OBLEMS
WALLACE BARNES COMPANY
BRISTOL, CONNECTICUT
THE WILLIAM D. GIBSON COMPANY
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RAYMOND Manufacturing COMPANY
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BARNES-GIBSON-RAYMOND
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DIVISIONS OF ASSOCIATED SPRING CORPORATION
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SEABOARD Coil Spring Div.
15001 S. BROADWAY GARDENA, CALIF.
OHIO DIVISION
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WALLACE BARNES COMPANY
STATE FAIR BLVD. SYRACUSE 9 (Solvay), N.Y.
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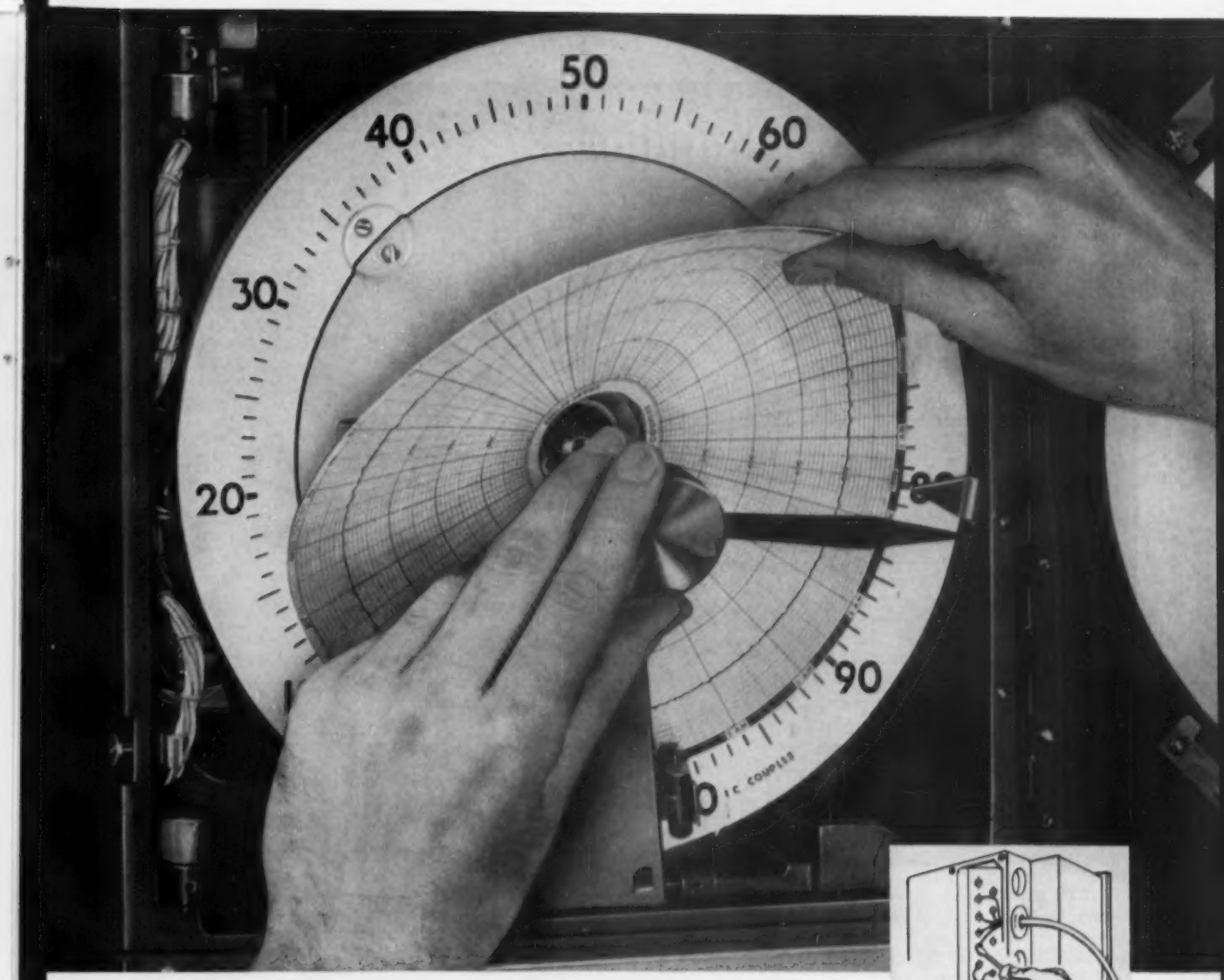
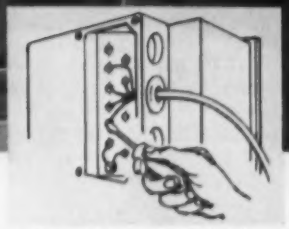
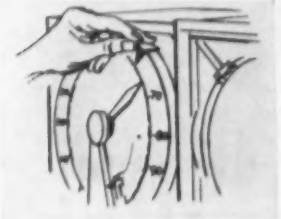
341 E. ERIE ST. MILWAUKEE, WIS.
DUNBAR BROTHERS COMPANY
BRISTOL, CONN.
F. N. MANROSS AND SONS CO.
BRISTOL CONNECTICUT
THE WALLACE BARNES CO., LTD.
HAMILTON CANADA





To put in operation, simply connect leads to back of case . . .



. . . set control point setter . . . turn on power switch.

A new concept in . . .

operating ease

WITH SPEEDOMAX® H

Although this round chart Speedomax H is small in size, you can set the control point or read it from a distance almost as easily as "big" instruments. For the easy-to-see control and indicating pointers travel around a large 23-inch scale. Chart changes take less than a minute!

All wiring connections are made to an external terminal board, at rear of the case. If you move the instrument from job to job, range changes can be made on the spot. A screw driver is the only tool you need.

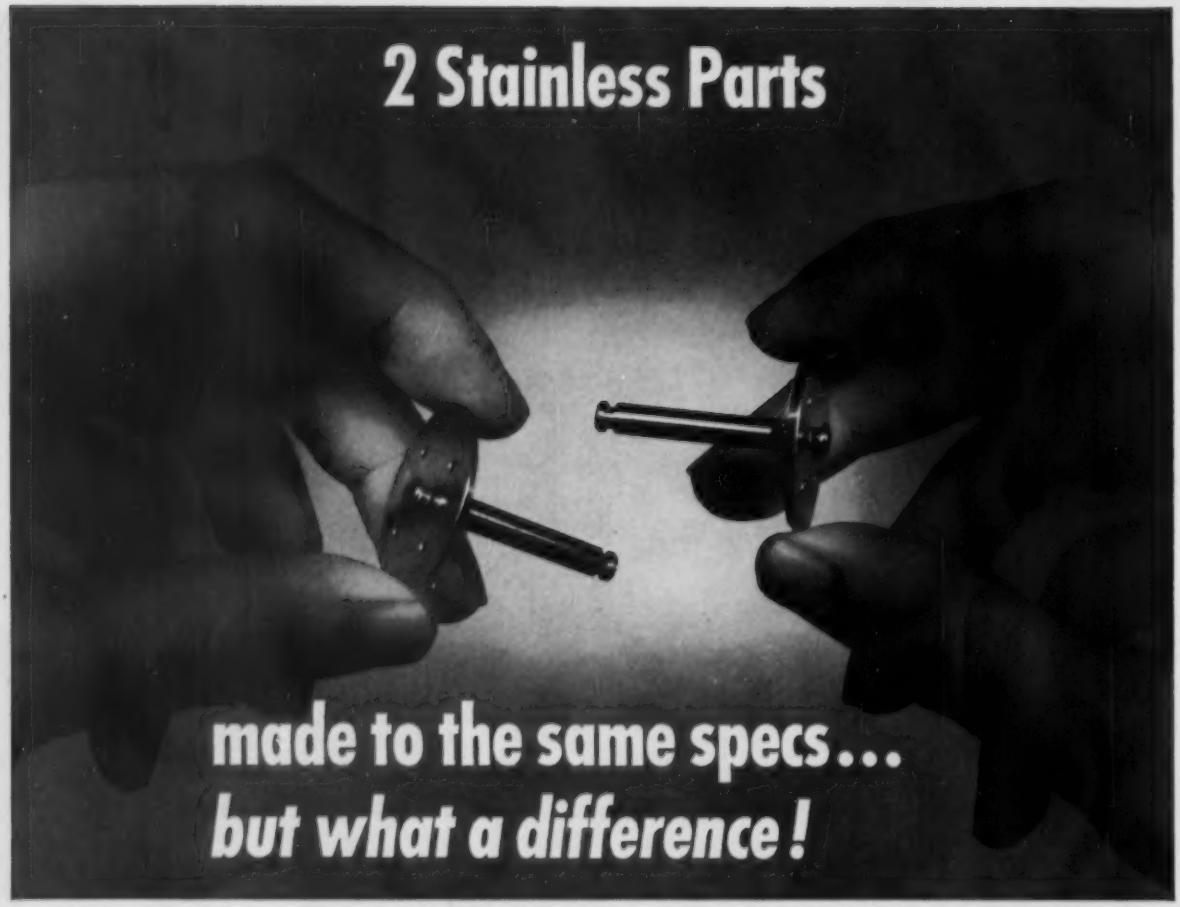
Whether you're using a simple indicator or a 3-action controller, all components are in one compact unit. Relays, amplifiers, etc., have plug-in connections.

In short here's a complete line of null-balance potentiometers available for a broad-range of temperature measurements including many now being made with non-potentiometer instruments.

To see the features of this new line, get our pictorial fold-out. Phone your nearest L&N office or write us at 4956 Stenton Ave., Phila. 44, Pa. and ask for Die-Out ND46(1).

LEEDS [LN] **NORTHRUP**

instruments — *automatic controls • furnaces*



Machining costs are 25% lower

This valve is used for a fuel return regulator check. Although the manufacturer was one of the first to use Carpenter Stainless No. 8 (Type 303) when it was first introduced, there have been occasions and conditions which required the use of ordinary makes of Type 303 Stainless Steels. The customer reports: Carpenter No. 8 *consistently* enables them to show a 25% saving in machining costs because of its constant uniformity and easier machinability.

Reject rate is reduced

An important requirement of this valve is that it be "leak-proof" in operation under pressure. To assure a tight seal, some surfaces are machined to a 5 or 10 micro-inch finish with tolerances as close as .0005". Because of the machinability and finishes obtained with Carpenter No. 8, rejects always take a sharp drop when compared with competitive Type 303 Stainless Steels.

Machine operators are happier

Here's an interesting sidelight: Machine operators can always spot an ordinary Type 303 without being told, because of the way it cuts in the machines. With Carpenter No. 8 they tell us they *know* the job will run smoother and faster with improved results. The same thing can apply in your *own* plant. So if you're looking for a way to improve performance and reduce costs on your stainless parts, CHANGE to Carpenter No. 8. See what the difference can mean to you. THE CARPENTER STEEL CO., 121 W. Bern St., Reading, Pa.

take the problems out of production

...change to Carpenter STEEL — **Free-Machining Stainless**

IMMEDIATE DELIVERY from local warehouse stocks!
Export Department: The Carpenter Steel Co., Port Washington, N.Y.— "CARSTEELCO"

a Natural when it comes to Passes

Typical Monarch Roll Turning Story

12¼ hrs.

vs

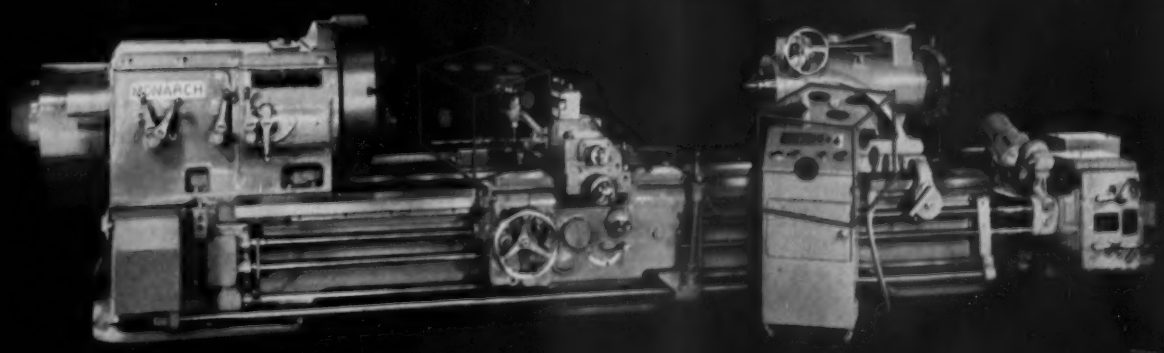
Old 31 hrs.

Why roll it the hard way when faster turning time is what comes naturally to our Heavy Duty Roll-Turner with Monarch-Keller controls? Every job report we ever got from a user confirms it! Consider this one:

Part is a 10" diameter roll having 30" body length and made of grain iron with a hardness of 60-65 scleroscope. It has 13 half-round passes ranging from 1⅝" to 1 $^{13}/_{16}$" diameter. Monarch rough turning time is 9¼ hrs.; finish turning time, 3 hours.—*total time, 12¼ hrs.*

For comparison, the most competent roll turner in the user's plant tried to compete on an old-style roll lathe. Working all-out, and much harder than the other operator, he still required 24 hrs. roughing time; 7 hrs. finishing time—*a total of 31 hrs.*

Why handicap yourself with costly old methods any longer? It's a sure bet that we can save time and money for you. Write for the complete story—illustrated Booklet #1302.



"SAVE IN MANY WAYS With The Monarch Heavy Duty Roll-Turner"

1. On all types of rolls which lend themselves to this method of turning, floor to floor turning time averages from ⅓ to ¼ of the former time.

2. With standard carbide turning tools with regular tool grinds, hundreds of form tools required by conventional methods are not needed. Tools can be changed with no sacrifice of contour accuracy.

3. With template controlled contour forming, matching rolls in pairs is unnecessary. Each roll turned from any given template is identical. One of pair of rolls can be redressed or new roll turned without matching the other.

4. When redressing a roll, the operator may quickly check the point of greatest wear with the corresponding point on the template after which he can be certain that the entire roll will clean up on the first pass.

5. The same template is used for both the rough and finish passes. Thus finishing immediately follows roughing with no set-up change other than the required tool change.

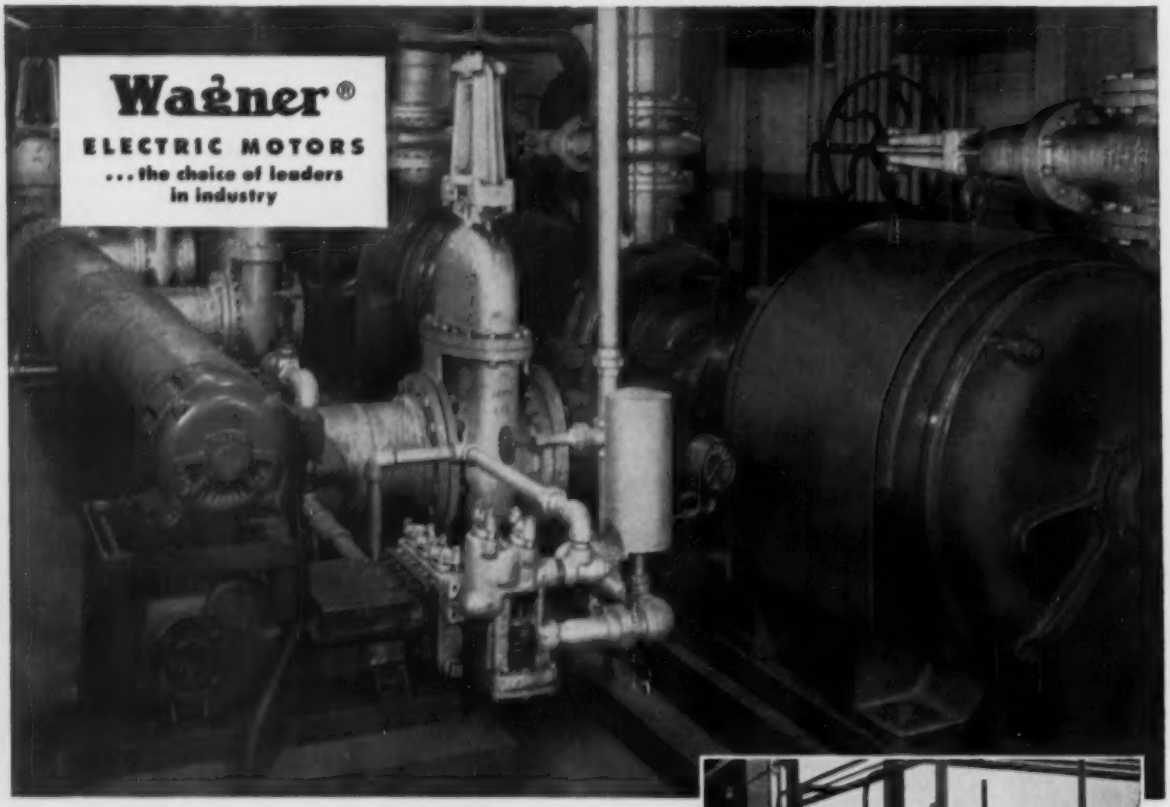
6. Operator cannot modify roll shape. As the template form is dimensionally the same as forms to be turned on the roll, their longitudinal placement and relationship are sure to be accurate.

Monarch
TURNING MACHINES

FOR A GOOD TURN FASTER . . . TURN TO MONARCH

THE MONARCH MACHINE TOOL COMPANY
Sidney, Ohio

Wagner Industrial Motors help continuity of operation at U. S. Steel's FAIRLESS WORKS



At U. S. Steel's giant Fairless Works, hundreds of Wagner motors drive fans, blowers, pumps, coal breakers and other vital equipment. Shown above are the 300 hp Wagner Type RP motors that operate gas washer pumps at Fairless.

This type of Wagner motor is built in ratings up to 400 horsepower. It is protected by a heavy steel frame with ventilating openings at the bottom only and by endplates of dripproof design. These motors have the winding strength required to stand the shock of starting heavy loads repeatedly and have adequate ventilation to operate continuously without exceeding their 40° C temperature rise.

A skilled Wagner engineer will be glad to help you select the correct motors for *your* specific application. Just call the nearest of our 32 branch offices, or write for Bulletin MU-185 for complete information.

A 60 hp, type CP-1 and two 100 horsepower, type EP-1 Wagner motors driving final cooler pumps in the coal chemical area at Fairless Works coke ovens.

Wagner Electric Corporation
EST. 1891

Wagner Electric Corporation
6403 Plymouth Ave., St. Louis 14, Mo., U.S.A.

BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

M55-17

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES • AUTOMOTIVE BRAKE SYSTEMS–AIR AND HYDRAULIC

Bridgeport HIGH I.Q. Silicon Aluminum Bronze Rod

It machines 50% to 70% as fast as free-cutting brass . . . is 9% lighter, 50% stronger than half-hard Naval brass, has excellent corrosion resistance and a tensile strength of 85,000 psi when annealed.

You can profit by using Bridgeport Silicon Aluminum Bronze Rod for high-strength screw machine parts, marine and pole line hardware, valve stems and pump parts, nuts and bolts. Free machining means faster production, longer tool life. High strength means superior wear, top performance.

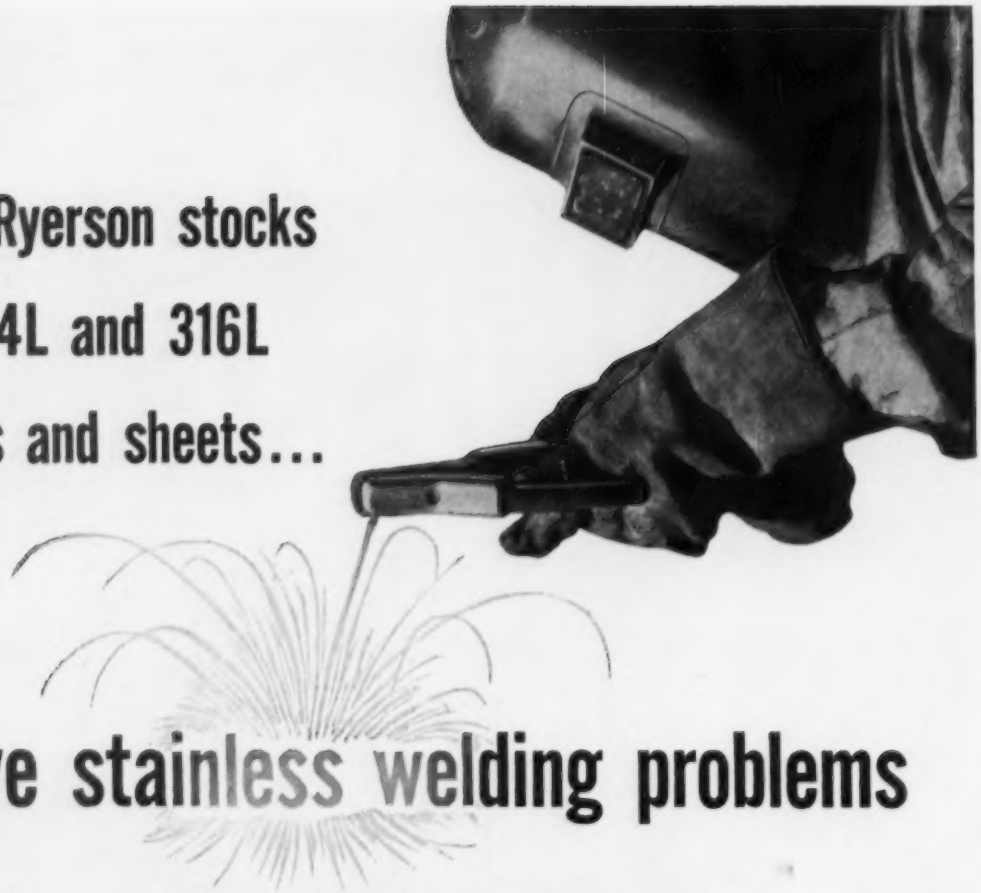
We'd like to put these advantages to work for you. Our representative will be glad to show you how the *High Inner Quality* of Bridgeport Silicon Aluminum Bronze and other Bridgeport Alloys can help you to product improvement.

BRIDGEPORT BRASS

Offices in Principal Cities • Conveniently Located Warehouses

Bridgeport Brass Company, Bridgeport 2, Connecticut • In Canada: Noranda Copper and Brass Limited, Montreal

New Ryerson stocks of 304L and 316L plates and sheets...



Solve stainless welding problems

One example of many special Ryerson steels and services

For many years, fabricators have had trouble with carbide precipitation in welding and annealing stainless steels. Now, new Ryerson stocks of low-carbon stainless solve this long-standing problem.

A small part of Ryerson stainless stocks—the nation's largest

Two types are available for quick shipment from your nearby Ryerson plant—plates and sheets in Type 304L and Type 316L. (Sheets are available in 10 to 16 gauge inclusive. Plates from 3/16" to 2" in thickness.) Both types generally eliminate the need to anneal after welding—can be used in place of more expensive stabilized stainless when stress relieving is necessary.

With the addition of these new low carbon types, you can now draw on Ryerson stocks for 2221 different kinds, shapes and sizes of stainless steel. And Ryerson stocks of carbon and alloy steels are just as large and diversified. So for stainless that solves welding problems —and every other steel requirement, call your nearby Ryerson plant.

RYERSON STEEL

In stock: Bars structurals, plates, sheets, tubing, alloy and stainless steel, reinforcing bars, machinery & tools, etc.

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CHARLOTTE, N. C. • CINCINNATI • CLEVELAND DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

The Iron Age Newsfront

Research: Turbine vs. Reciprocating

Despite substantial progress in gas turbine development, it is significant that at least 80 pct of today's research effort by the big auto firms is still going into reciprocating engines.

Automation Takes Over Coil Winding

One coil winding machine now has an output up to 3000 coils per hour. Moreover, one operator can run two machines simultaneously. Major uses for the machine will be for bobbin windings such as in electrical instruments, relays, and universal, bank, and self-supporting windings.

New Aluminum Alloy for Aircraft

Research aimed at adapting aluminum to high-temperature conditions has resulted in a new alloy. It is said to have excellent properties around 500° to 600°F, a range which should make it useful in or near aircraft and automobile engines. Thus far, it is available in experimental quantities only.

Seek New Answers to Car Corrosion

Development by GM of a cyclic humidity accelerated corrosion test may be the forerunner of extensive research by automobile producers into corrosion phenomenon. Present work seeks an addition or combination of elements which will produce increased resistance to shelter-corrosion at low cost without affecting forming characteristics adversely.

Steel Buying Pressure Stays Up

Minor downward fluctuations in the operating rate during the next few weeks will not mean a decline in pressure for finished steel. Third quarter buying pressure continues unabated, but mills are forced to make repairs after operating 90 days at full capacity—particularly in open-hearths. With no reserve furnaces being repaired, steel output is cut as soon as furnaces are pulled out of production.

Look For New Uses of Uranium

Recent operations in one of the country's major forge shops indicate that new uses are in store for uranium. Press forging of uranium in ingot form is being done for the first time on a pilot plant commercial scale. Invaluable data on heating to forging temperatures, effects of heat treating, are being compiled.

Need For Ore Carriers Tightens

Ocean-going ore-carrying vessels are already in fairly short supply, but the need for them is certain to grow even greater in the next few years. Larger purchases of foreign ores to supplement supplies on this continent will hasten the conversion of commercial vessels and new ship construction for ore carrying service.

Interpreting GAW

Look for new automotive expansion in the wake of new labor contracts. Theory is that with supplementary unemployment pay guaranteed, automakers will increase facilities to provide for maximum production on a one-shift basis to avoid hiring extra personnel for short periods.

Magnetic Clutch Eliminates Wear

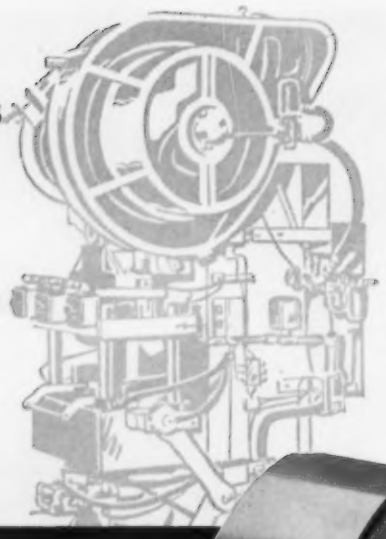
No chatter, no grab, no wear. These are the claims for a new magnetic particle clutch. It has no gears, sprockets, lining, springs—and uses no air or fluid pressure. Magnetic particles between the gap of the driving and driven members form "chains" along the lines of magnetic force. One machine tool builder is using them in new machines and for replacement on older machines.

U. S. Will Buy More Guided Missiles

Government buying of guided missiles will edge up during the next 12 months, while ammunition purchases will ease off somewhat. Defense Dept. will spend about $1 billion on ammo.

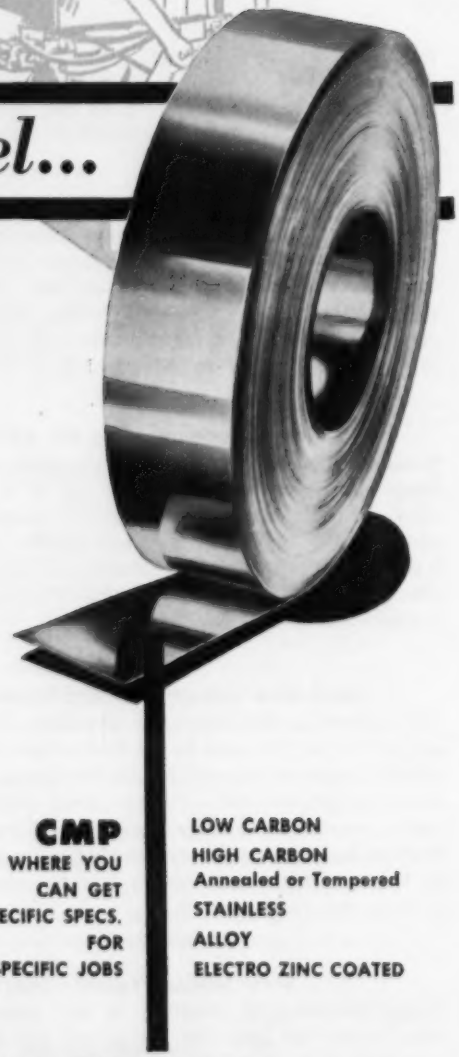
LIKE REVOLUTIONARY COST CUTTING PRESSES

that operate with near-human dexterity, superhuman accuracy, speed and endurance and minimum human effort and attention to produce better products faster and more economically . . .



CMP

cold rolled strip steel...



can help reduce your manual costs!

CMP's precision processing methods hold oversize width and gauge variations within exceedingly close limits (even as fine as 5" ± .003" x .067" ± .001" if required), resulting in . . .

. . . top parts yield per ton . . . more feet per coil . . . fewer production interruptions for coil replacement on automatic feed operations.

. . . less wear on dies . . . fewer die changes and "regrinds."

. . . easier fitting and assembly . . . fewer "oversize" rejects . . . less tedious "resizing" to make oversize parts fit.

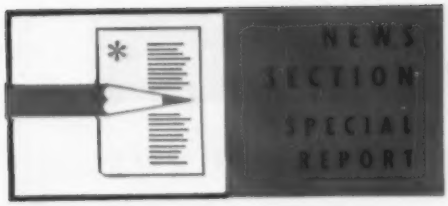
More important . . . in many cases, CMP Cold Rolled Strip Steel can be processed to restricted physical specifications to facilitate, consolidate or even eliminate labor-consuming production operations and handling. Often, a simple specification change can do as much or more to reduce manual costs than expensive new equipment.

A qualified CMP representative will be pleased to check your flat-rolled material specifications and fabricating processes with a view to developing restricted specifications that will cut your end-product costs.

CMP
WHERE YOU CAN GET SPECIFIC SPECS. FOR SPECIFIC JOBS

LOW CARBON
HIGH CARBON
Annealed or Tempered
STAINLESS
ALLOY
ELECTRO ZINC COATED

the Cold Metal Products co.
GENERAL OFFICES: YOUNGSTOWN 1, OHIO
PLANTS. YOUNGSTOWN, OHIO AND INDIANAPOLIS, INDIANA
SALES OFFICES: New York • Cleveland • Detroit • Indianapolis
Chicago • St. Louis • Los Angeles • San Francisco



COLD EXTRUSION: It's Growing Up

Military and civilian applications are increasing . . . New plants being installed . . . But full industry stature is some years away . . . Major problem is better understanding of process—*By T. M. Rohan*

◆ IN ITS REQUEST for bids on 8-in. shells, the U. S. Ordnance Dept. this year specified—for the first time on shells of that size—that they be produced by hot forging followed by cold extrusion.

Although final awards among the more than 60 bidders have not been made, observers estimate that the 175 lb shells will be bid in at about $18-20 each. This is about 55 pct of the World War II price for the same basic shell made by hot forging and machining.

The comparison illustrates the progress made in the U. S. on the war-born cold steel extrusion since Allied investigators in postwar Germany found cold extrusion equipment for shells up to 37 mm.

Cold extrusion is consistently making inroads into commercial production. Its general commercial advantages are: high strength without heat treatment, close tolerances without machining, smooth surfaces without grinding, integral bottoms without welding, designs not possible by ordinary methods.

The first known successful cold extrusion of titanium has also recently been accomplished by Battelle Memorial Institute at Columbus, O., under an Air Force research contract, paving the way for easier commercial production of fasteners.

Commercial Applications

In aluminum, impact extrusion techniques commercially are producing automotive piston sleeves, spark plug covers, valve push rods, pistons, food and beverage containers, dryers, de-humidifiers and many other items.

The major commercial applications of cold steel extrusion are in automotive cylinders, pressure accumulator cylinders, aircraft propeller balance cups, high pressure bottles, automotive shafts, light switches and a variety of smaller parts. Admittedly its full potential will not be fully accomplished until there is a cold extrusion industry. Guesses on this range from 5 to 20 years.

Ordnance extrusion know-how is also branching into commercial uses. Oliver Corp. at Springfield, O., this month winds up shipments of a 60 mm high explosive mortar shell produced at a claimed cost saving of 25 pct, with a 35 pct savings in steel.

New Mullins Plant

The firm now is gearing up for production of hydraulic cylinders for its farm tractors, various pressure cups and possibly fire extinguishers. Physical properties can be built from 35,000 lb yield strength to 105,000 lb without heat treatment and necessary tolerances held. Closed end cylinders are produced much more readily than by welding ends of tubing.

Mullins Mfg. Co. this year dedicated a $20 million plant near Pittsburgh equipped with 75 presses for turning out shells. Commercially the firm is cold extruding power steering cylinders for tractors and trucks, pressure shells up to 42 in. long, propeller nosepieces and carbon dioxide cylinders.

Malvern Steel Products Co., Malvern, Ohio and Malloy Corp., Detroit are making automotive transmission shafts with four stepped-down diameters. These solid bar extrusions use principally Type 4130 and 8645 Steels and 8620 carburizing grade. Braun Engineering Co. near Detroit is also making

What's the Pitch on Cold Extrusion?

- **This war-born process is making slow but steady progress as a better and cheaper way to produce certain military and civilian products. But there are still problems to overcome. Full industry status may be 5 to 20 years away.**
- **Major commercial applications include automotive cylinders, pressure accumulator cylinders, aircraft propeller balance cups, high pressure bottles, automotive shafts, light switches, and a variety of smaller parts.**
- **Problems include: better understanding and appreciation of the process, the need for more technical know-how of die design and tool life, need for more basic research in steel to improve extrudability of ordinary steels, and the need for engineering specifications to cover mechanical and physical properties.**

up to 25,000 stop light switches daily.

Heintz Mfg. Co. of Philadelphia has done considerable development work on cold alloy steel extrusion as well as nonferrous metals. The alloys can be successfully cold extruded although they require more in-process annealing than carbon steel.

Carbon Steel Potential

There is a concentrated effort by industry to obviate machining whenever necessary. Much of the interest stems from the smaller class of parts made on screw machines where excessive amounts of chips are involved. In the small parts field the number of parts required generally runs from 100,000 to several million. Much of this market is in aluminum.

On larger parts interest is centered in single lot quantities from 1000 to 100,000. There is a major potential market in carbon steel, but the combined market in nonferrous alloys plus stainless and alloy is even larger. Some orders for large parts of cold extruded carbon steel amount to $6.5 million.

The general equipment needed for cold extrusion consists of cut-off machinery, usually cold saws. Processing lines of either dip tank type or continuous are needed to apply the necessary lubricant. This practice consists of sulfuric acid pickle, wash, and rinse; bonderize, wash and rinse and a liquid soap application and drying.

Industry Problems

It is also necessary to alkali wash in-process parts as they come from the presses before they are reprocessed for the next extrusion operation. Cold extrusion tools in the nature of punches and die rings involve a major consideration in equipment. Die costs may run as low as $10,000 to produce a small part, but do run as high as $100,000 for large size parts 36 in. and over.

Some of the chief hurdles in cold extrusion exist more as a frame of mind or lack of full understanding and appreciation of cold extrusion than as engineering problems, according to authoritative sources. Most engineering problems center not around equipment, but around technical know-how of die design and tool life.

Also, steel companies have not generally produced or done any research in basic steel making to improve extrudability of ordinary steels. Cold extrusion of steel is also so new that there are no engineering specifications to precisely cover the mechanical and physical properties of extrusion as such. Technical committees have recently started discussion of such specifications.

The only extrusion jobs being made today were ordered because they reduced the cost of manufacturing. The cost of a cold extrusion is penalized if the extrusion is used merely to replace an item formerly made by any number of conventional methods.

Economics Involved

An analogy is a screw machine product designed with all the advantages and limitations of multiple spindle machine tools in mind. To substitute an extrusion for the exact piece designed for screw machine production would not produce a fair comparison. To replace such an item with a cold extrusion or parts made by any other process immediately imposes disadvantages on the new process.

The cold titanium extrusions at Battelle were made on a 700 ton press using a series of special dies and a Battelle-developed chemical fluoride lubricant base and heavy duty lubricants.

Other cold titanium extrusions have been made as much as four years ago by such firms as Titanium Metals Corp. and Heintz Mfg. Co., Superior Tube Co., and Babcox and Wilcox but have not gone into commercial production.

Highlights Spotted

Among highlights recently cited by Lukens Steel Co., Coatesville, Pa., in the company's plant development program, totaling more than $32 million in new and modernized facilities since 1945, were:

A new heat-treating building, slated for completion next month, in addition to new heating pits for processing more heavy plate; a 5-million gal water reservoir, pump house and power station; a 5000-ton press for flattening heavy plate; a $1 million heat-treating line in the Clad and Alloy Dept., and a $5 million centralized maintenance building.

COLD extrusion of steel is accomplished on presses of this type at plant of the Oliver Corp. in Ohio.

CUTAWAY view shows various stages of cold extrusion in producing 60 mm high explosive shell.

STEEL: Why More Capacity is Coming

ODM plans tax incentives for more capacity . . . May gain up to 13.7 million tons by 1959 . . . Cushion for defense has disappeared during current boom . . . Executives agree on need—By *Tom Campbell.*

◆ A SUBSTANTIAL steel expansion program is being kicked around quietly by the government and the steel industry. Office of Defense Mobilization will soon make a recommendation as to the increased steel ingot capacity it believes is necessary to adequately prepare for the danger of a war.

Steel firms were planning expansion before the government got into the picture. However, ODM's program will probably provide for five year amortization of the increased capacity expected to be installed or made available during 1956, 1957 and 1958.

IRON AGE estimates that by Jan. 1, 1959, the steel industry will have 139.5 million tons of steel capacity—an increase of 13.7 million tons over the Jan 1, 1955 figure of 125.8 million tons. This estimate assumes that about 1.7 million tons of new capacity will have been made available by the end of this year and that a total of 12 million tons will materialize during the three-year period beginning January 1956.

Agree on Need

This 12 million tons for the years 1956 to '58 inclusive is conservative. During past expansion periods the industry has always wound up with more ingot capacity than had been planned or anticipated.

Much of this better showing in the past has been due to underestimating new equipment, to a competitive cautiousness in making public the figures and to the generally conservative attitude prevalent within the industry. In recent months Benjamin F. Fairless has inferred that we will need approximately 2 million tons of new steel capacity per year for some time, while B. A. Homer of Bethlehem Steel suggests need for 4 million tons a year. The odds seem to favor Mr. Homer's estimate—at least during the current program.

Not Enough Ingots

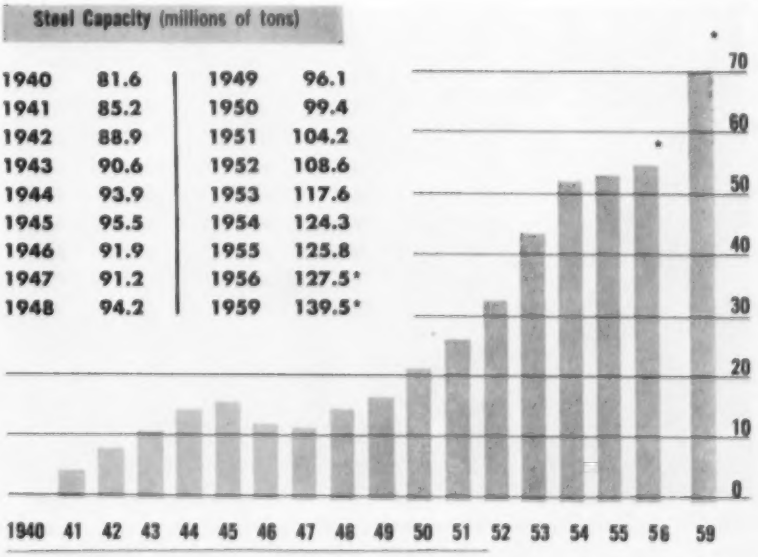
Most of the steel expansion to come over the next several years will be carried out by extensive rebuilding and modernization of existing plants.

Many major steel companies today do not have enough ingot capacity in many of their plants. The current market situation on sheets and plates points this up. If more ingots were available it is probable more plate could be produced. Many of the medium size steel firms are looking closely at oxygen steel making setups and some are at least taking more than a passing interest in the blast cupola.

There is a feeling that increased ingot capacity can be brought about by enlarging open hearths, changing wall and bottom sizes, tearing out and replacing checker work, increasing ladle sizes, rebuilding pouring platforms, strengthening and expanding crane runways, and enlarging charging boxes and charging machinery. This has been done in the past and will be in the future. There will be new furnaces as well.

How Much Will Steel Capacity Grow?

Steel Capacity (millions of tons)			
1940	81.6	1949	96.1
1941	85.2	1950	99.4
1942	88.9	1951	104.2
1943	90.6	1952	108.6
1944	93.9	1953	117.6
1945	95.5	1954	124.3
1946	91.9	1955	125.8
1947	91.2	1956	127.5*
1948	94.2	1959	139.5*



Figures are based on steel capacity on Jan. 1 of each year.

*Iron Age estimate

LABOR

UAW CONTRACTS: Read the Fine Print

GAW principle obscures other benefits . . . Pension, hospitalization, disability payments are improved significantly . . . Triple time for holiday work means little . . . Skilled workers helped—By *T. L. Carry.*

◆ BECAUSE of the impact of supplemental unemployment benefits granted to Ford and GM workers, there is a tendency to overlook some of the other benefits in the agreement that are just as startling.

When Walter Reuther, president of the UAW-CIO, referred to the agreements as the best ever, he wasn't kidding.

Take, for example, the case of pensions. In addition to increasing the amount and eliminating the 30-year maximum for benefits, both Ford and GM gave the workers vested pension rights.

Pensions Increased

This is how it works: An employee who leaves the company before he is 60 and has built up pensions rights for himself, can take his pension rights with him and will be paid them when he reaches the age of 65.

Under the new plan, a retired employee with a wife also 60 years old can receive $237.80 per month in total benefits and social security. When social security benefits are liberalized in 1956, the retired employee can receive $252.80 per month.

Disability benefits were also liberalized. Employees who are totally and permanently disabled after 15 years of employment will receive monthly pension benefits of $4.50 per month per year of service. The rate formerly was $3.00. Age limitation was also eliminated.

Another major milestone for the union was the granting of improved group and medical insurance plans. Both companies increased life insurance benefits on an average of $500. Although the amount of coverage varies, the increase granted is just about the same.

In the field of medical and surgical insurance, Ford and GM agreed to make the coverage more comprehensive.

Previously, employees who participated in the program received help in paying medical bills through Blue Cross and Blue Shield plans, or whatever plan was locally available. But in some areas the plan available was not as beneficial as the Michigan Blue Cross and Blue Shield coverage. Both companies have agreed to try and make available to employees in such areas a plan that would equal the amount paid by Michigan coverage.

The triple time for holidays which was given to workers not on a regular 7-day schedule doesn't mean much to the average employee. If a company has a rush job, they will call a man in on a holiday, but you can rest assured that everything will be done to make sure it is not necessary.

Rates Equalized

Skilled workers in both firms receive a pay raise in addition to the 6-cent improvement factor. This was a foregone conclusion no matter what else happened because the union has always maintained that skilled trades are entitled to more money.

Unlike Ford, GM granted their workers a wage inequity fund of 2 cents an hour. In some GM plants, certain types of workers receive more than others. The pay scale for women, for example, has always been lower. This fund is to be used to bring the pay rates more in line with one another. The problem will be worked out on a local level.

Another first for GM was the granting of an unqualified union shop.

OFF TO A SMILING START on wage talks for steelmen, slated to end June 30, are USW's Dave McDonald, left, and Clifford H. Hood, Pres., U. S. Steel Corp. Outcome of auto talks will affect steel discussions.

DEFENSE: Foreign Aid Pays Dividends

Figures show that mutual defense aid stimulates defense spending by our allies . . . Production facilities built with our help will be ace in hole if war comes . . . Struve Hensel leaves Defense Dept.

◆ H. Struve Hensel, best known for his part in triggering last year's Army - McCarthy explosion, is stepping down as Asst. Secretary of Defense for International Affairs at the end of this month to return to private law practice. Reason: he "can't afford the luxury of a top government job."

It's the Army-McCarthy tag that will stick with Mr. Hensel. The headlines he received during the hearings have overshadowed the much more important job he handled in guiding the Mutual Defense Assistance (MDA) program under which $11.5 billion has been spent in the last 5½ years to support our allies. And outlook for the next 2 years is that MDA spending will run between $6 billion and $8.4 billion.

That the U. S. needs strong allies, and that to make them strong we will have to continue supporting them with both military and financial aid, is a dead horse that shouldn't have to be whipped. But there is still strong feeling in some groups that MDA is a government handout to a lot of people who don't care about protecting themselves.

NATO Spent $43 Billion

But the figures show this isn't the case. While the U. S. has been funneling out $11.5 billion over a 5½ year period for military hard goods and training for our allies all over the world, NATO nations alone have spent approximately $43 billion for their own defense.

Undoubtedly most of our allies would have done something about strengthening their own defenses even without our aid. But the job they faced after World War II was so hopeless, that without our assistance, it is doubtful if anywhere near so much would have been accomplished.

STRUVE SIGNS OUT: Asst. Defense Secretary H. Struve Hensel signs farewell photos prior to leaving Defense Dept. at end of this month.

And the money is being well spent. The $11.5 billion in Mutual Defense Assistance funds that was spent during the last 5½ years has bought 9.8 million tons of military hard goods for our allies. Included in this were:

145,000 electronic and communications items; 206,000 motor transport vehicles; 36,500 tanks and combat vehicles; 36,500 artillery pieces and a tremendous amount of ammunition.

Off-shore purchases (procurement system through which the U. S. buys from foreign countries military items needed by our Armed Forces) is an important item. Of total appropriations of $18.5 billion for military assistance for fiscal years 1950 through 1955, $2.6 billion has been earmarked for off-shore purchases.

Even more important than the sum involved is the fact that these expenditures stimulate our allies to build production facilities needed to fill the off-shore orders. This means that in event of war our allies will have the plant and the technical knowledge needed to turn out their own military items.

One phase of the off-shore purchasing program that Struve Hensel has been pushing is that of a matching fund policy. Under this the U. S. would promise to spend a certain amount for off-shore purchases in a given country, if that country promised to spend a certain percentage of the total for its own defense.

Idea behind the matching fund program is that over the long run, the U. S. share would decrease while our allies' percentage would rise.

As he leaves the government for private practice, Struve Hensel leaves behind him a well-oiled, smooth-running machine that is contributing importantly to our own defense and to world peace.

ANTITRUST: A Bust For Politicians

Hearings a disappointment as source of campaign material . . . Auto and steel witnesses say wrong things for politicos . . . Bethlehem, Youngstown defend proposed merger . . . Weir testifies—By *N. R. Regeimbal.*

◆ EFFORTS of congressional politicians to reap campaign hay by sowing the seeds of strife between the bigs and the smalls of the steel and auto industries at current antitrust hearings have so far borne little fruit.

The legislators, mostly Democratic, set up hearings in four committees on both sides of Capitol Hill. Most important so far have been hearings by the Senate and House antimonopoly subcommittees, although the small business committees have also tossed the merger and monopoly ball around.

Intention of the hearings was to collect strong criticism by the smalls in industry against "monopolistic" practices of the giants, which would be used later as vote-getting material and as a basis for new antitrust legislation. The lawmakers also hoped to collect statements from the big firms for the same purposes.

But the committees have been able to collect little that could be turned to political advantage.

Steel Testimony

Closest the lawmakers have come toward developing any real split in an industry is in testimony of representatives of Bethlehem and Youngstown in the Senate subcommittee, while a National Steel spokesman was testifying before a House subcommittee.

Arthur B. Homer, President of Bethlehem, and George McCuskey, Vice-President of Youngstown, argued before Sen. Harley M. Kilgore's Senate antitrust group that the proposed merger, opposed by the Justice Department, would increase competition in the mid-continent area by creating financial resources for a 3 million ton expansion of Youngstown's two plants.

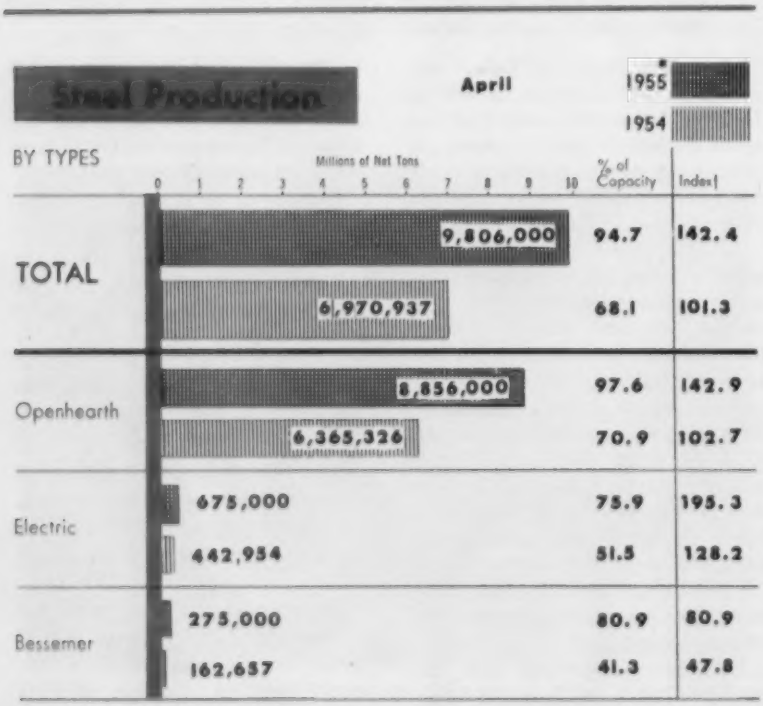
In addition, they said, the merger would aid national defense, aid steel users, provide more jobs, and provide product diversification. As soon as the firms can find a way to have the legality of the merger tested speedily in the courts, they will go ahead, the two company officials told the West Virginia Democrat.

Almost simultaneously, Ernest T. Weir, Chairman of National Steel Corp., told a House antitrust subcommittee headed by Rep. Emanual Celler, D., N. Y., that a prospective steel industry with a 200-million ton annual capacity in the future means "bigger and bigger business." While refusing to discuss the proposed steel merger, he said there's nothing wrong with growth when it is internal, but says he believes when natural growth is broken by one firm becoming too big, the competitive situation will become unbalanced, and this "may in fact force additional mergers."

Auto Competition Defended

Mr. Weir also pleaded for Congressional approval of bills now pending which would permit freight absorption, if made in good faith, in order to let all companies compete and prevent "geographical monopolies."

And the auto industry has been particularly disappointing to the "antitrusters"—would be trust-busters. After hearing represen-



tatives of Chrysler and American Motors stoutly defend the industry's competitive health, Sen. Kilgore was faced last week with statements of Edgar F. Kaiser, President of Kaiser Motors Corp. Mr. Kaiser said that, rather than being "undesirable," the present concentration in the auto industry among the big three is a beneficial force because the competition is giving consumers top products at the best possible price.

The Kaiser executive also says that the auto industry is open for new entries, that it is a healthy industry, and the concentration is not unduly hurting the independent producers.

Proposed Law Changes

Several antitrust bills are now pending. Among them are measures to increase antitrust fines from $5,000 to $50,000; permit the Government to recover damages it suffers as a result of antitrust violations and setting a uniform four-year statute of limitations in antitrust cases.

Others would require advance notification from firms planning to merge to the Justice Department and the Federal Trade Commission, and one would suspend a merger if the Government files a complaint.

Wage Act Applies

Federal wage regulations, says the U. S. Supreme Court, cover employees working within a state on a new section of an interstate highway, railroad, or canal.

This new decision places new construction on interstate routes on the same legal basis as repair and maintenance of existing routes, which are recognized as being subject to the Fair Labor Standards Act. Application of the law to a canal project in Louisiana was sought by the U. S. Labor Dept.

The Supreme Court has upheld the Labor Dept. effort to have C. W. Wollmer & Co., Inc., New Orleans contractor, abide by federal overtime and record-keeping rules.

A federal district court and the U. S. court of appeals in New Orleans had held that Vollmer was not in interstate commerce.

PRODUCTION

TUBING: Drawbench Unveiled

New equipment will draw five copper tubes at same time . . . Inverted bull block designed to speed production of small diameter tubing . . . Features outlined.

◆ AETNA-STANDARD Engineering Co. recently unveiled new models of large-capacity drawing equipment that will soon be producing for several of the country's leading copper tube manufacturers.

At its plant in Ellwood City, Pa., Aetna-Standard engineers demonstrated a dual chain drawbench capable of drawing five tubes simultaneously and an inverted bull block designed to facilitate production of long length, small diameter, thin wall copper tubing.

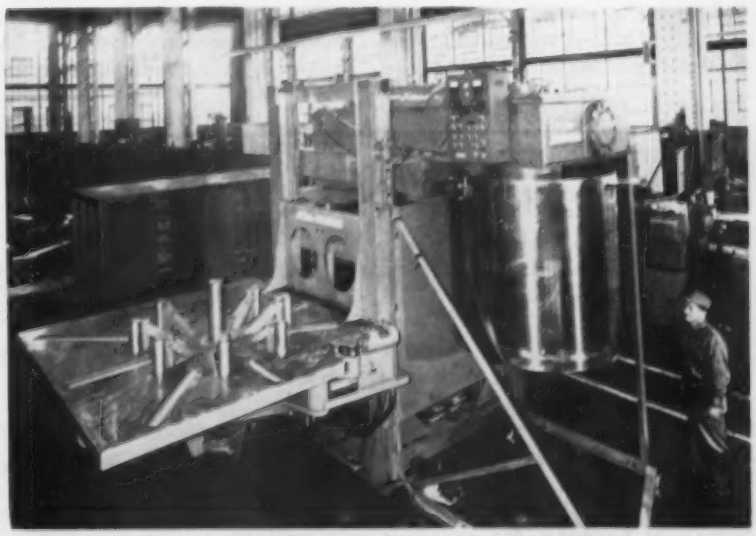
Drawbench capacity ranges from 150,000 lb pull at 110 fpm to 50,000 lb at 330 fpm. Overall length exceeds 350 ft. It will handle tubes up to 150 ft before drawing to 200 ft after drawing. Outside diameter capacity ranges from five inches for a single draw to three inches when five tubes are drawn simultaneously.

The drawbench features a pneumatically operated head for gripping the tubes. Aetna-Standard engineers pointed out that these grippers guarantee a more positive hold and are a prime factor in permitting five tubes to be drawn at the same time.

The bull block has a maximum 10,000 lb pull and a speed range of 150 to 2000 fpm. Principal feature is the ease and simplicity of handling the coil. The operation is largely automatic, with coils being released at end of the draw and handled by an integral conveyor system.

Electrical coordinating and safety devices are used extensively.

It was pointed out that by using the equipment in a progressive series of drawing passes it is possible to start with a 5-in. OD tube on the double chain drawbench and advance to a coil of approximately ¼ in. OD x .029 in. wall and thousands of feet long off the block.



INVERTED BULL BLOCK manufactured by Aetna-Standard permits drawing of large length, small diameter thin wall copper tubing at greater speeds and easier coil handling than earlier models.

CO_2: Its Market Won't Go Flat

Industrial use grows in many diverse fields . . . 1955 market may reach $47 million . . . Core hardening, shielded welding, coolant, steel hardening are a few of its growing uses—*By K. W. Bennett.*

◆ CARBON DIOXIDE, after decades of putting fizz into seltzer and pep in pop, is aimed at more of the industrial market. The target: a substantial share of the $200 million plus that is spent annually for industrial gases.

The rise has already been sharp. Despite the prevalence of pop bottles at any summer ball game, the soft drink industry takes a back seat to commercial and industrial users of carbon dioxide. In 1950 carbon dioxide sales as a gas, a liquid, or a solid, reached $30,288,000; in 1952 they jumped to $34,755,000; in 1953 to $41,308,000; in 1954 the gas, like many industries, sank and $39,632,000 worth was shipped.

Market in Metalworking

The estimate for 1955—$47,558,874 or 864,706 net tons, and a record year. Liquid and gas sales began the year strongly. Dry ice, solid carbon dioxide, opened first quarter slowly then began zooming in the closing month of the quarter. For dry ice the big selling season, July through August, is still ahead. At least one producer calls the 20 pct gain "permanent." At least five new plants are in operation or will have come into operation this year, indicating that optimistic estimates are being backed by solid capital expenditures.

The gain has thus far come from old line customers. But waiting off stage are carbon dioxide applications that will not begin to be felt strongly in the market until 1956. Most of these are in the metalworking industries.

Foundry core hardening: Carbon dioxide researchers are strongly enthusiastic about this, probably more so than carbon dioxide shielded welding. Dry sand is mixed with a sodium silicate binder. The binder and sand are molded to the correct shape, and carbon dioxide is added. The carbon dioxide combines chemically with the sodium silicate (as little as 0.25-0.3 pct CO_2 is needed) a silica gel is formed and the mold is then ready for casting. Additional time, up to 1 hr, will enable the mold to set even more firmly.

Shielded welding: Metal inert gas welding and tungsten inert gas welding have been developed. The technique is very similar to argon shielded welding. Despite considerable differences of opinion, test welding has proved successful with stainless and alloy steels as well as standard carbon steels, and has already gained a foothold in the automotive industry. Liquid Carbonic, Pure Carbonic, and Cardox, three of the industry's largest producers, have worked closely with the metalworking industry in both of these developments. The sales appeal: savings of up to 65 pct over argon shielded welding.

As a coolant for machining and grinding operations: After considerable debugging, carbon dioxide cooling has been particularly successful in cooling for problem metals. One aircraft company claims that without use of CO_2, broaching of a particular titanium part would have posed a major problem. Sales engineers for carbon dioxide admit that cost is a disadvantage for carbon dioxide in this application.

Steel hardening: This utilizes liquid carbon dioxide or dry ice, often in an alcohol bath, where steel is to be given an extra degree of hardness for a precision application. The steel is commonly lowered to room temperature, then plunged in the supercold bath.

Investment casting: In which mercury is frozen with carbon dioxide to form a pattern around which the mold slurry is packed.

Purging: It is used in purging of hydrogen filled generators during repair work, of inflammable gases developing in paint, varnish, or chemical manufacture; and of electronic components during assembly of electronic tubes.

Low temperature testing: Chiefly for the aircraft industry but the products tested range from complete jet engines requiring a room sized test cell, back down to the pilots who will fly them.

Ore sintering: Still being tested.

Where CO_2 Finds New Markets

FOUNDRY CORE HARDENING: As binder with sodium silicate, it hardens molds for casting.

SHIELDED WELDING: Tests prove successful with stainless and alloy steel as well as carbon. Already has a foothold in auto industry.

COOLANT: Particularly successful in cooling problem metals for machining and grinding.

STEEL HARDENING: As liquid or dry ice, it gives steel an extra degree of hardness for precision applications.

INVESTMENT CASTING: Mercury frozen with CO_2 forms a pattern to pack mold slurry.

NEW HOMES: They're Using More Steel

Homebuilding highs plus new construction techniques mean bigger markets for finished steel . . . New units take up 1.6 million tons today . . . Tomorrow's all-steel homes will use much more—By *D. G. Picinich.*

◆ FINISHED STEEL consumption in the current homebuilding spurt should show more peaks than valleys—if all-time high construction figures and wider-scope product applications are any barometer.

Following the homebuilding peak in 1950, Commerce Dept. estimated that more than 1.6 million tons of steel went into 1.4 million new dwelling units. A year later, 1.3 million tons poured into slightly more than a million new housing starts.

This year, new housing starts will come to about 1.3 million—the second best year on record.

If past records mean anything, the year will be among the best for finished steel going into popular-type 1000 sq ft average homes. Bigger standard-type houses—now coming back on the market—could easily consume well above the minimum average tonnage going into the smaller homes.

American Iron & Steel Institute conservatively estimates that 3.5 tons of steel could easily be used in constructing and equipping a modern standard-type 6-room home. The prototype illustrated gives a rundown of how much steel could be used from attic to cellar.

In the most up-to-date kitchens, says AISI, 1.5 tons of steel products might be required for the structure, furnishings and equipment. In 1938, less than half this amount was used throughout a typical "small dwelling."

Wider-Range Uses

Wider-range applications for finished steel in home building are making steady market inroads.

Case in point is the 7-room, 2-bath ranch-type "Erector set" home recently put up in New Jersey. Altogether, 9.5 tons of lightweight structural steel sections went into this forerunner of tomorrow's all-steel home.

Instead of the usual wood, all the studs, beams and joists are made of thin steel, formed into sections, with excess metal punched out. This type of steel framework is not just a one-time stunt.

Sections, prefabricated to size, can be bought from the Penn Metal Co., Parkersburg, W. Va. A long-time fabricator of metal lath and expanded metal, the firm's "Lightsteel" structural sections began appearing two years ago.

Joists, studs, track and bridging are designed to fit together for assembly and welding in the shop or at the job site. Light-weight wall units can be readily trucked to the job and erected in a few minutes. Erection time for framing an average residence is about one working day for a 5-man crew.

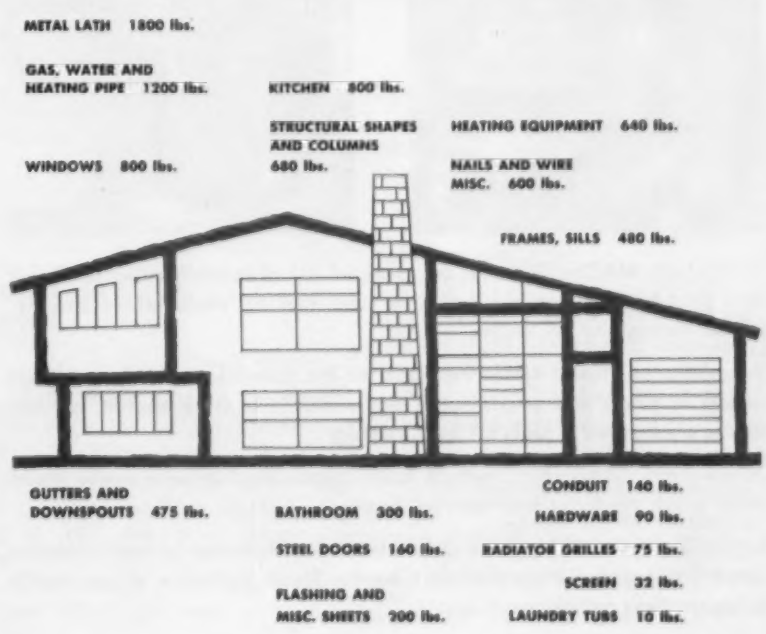
Total cost of this home came to less than $23,000. Cost per sq ft was less than $10. Under conventional building methods, cost would be about $3.50 a sq ft.

Among selling points cited for the steel-frame type of construction are maximum rigidity against warping, shrinkage or sag; resistance to fire, and protection against termites.

So far, the majority of "Lightsteel" homes have been built by operating contractors working from individual specifications. Mass-produced construction has yet to come.

U. S. Steel Co. however, has in the works a new all-steel home.

From Attic to Cellar—More Uses for Steel


METAL LATH 1800 lbs.
GAS, WATER AND HEATING PIPE 1200 lbs.
KITCHEN 800 lbs.
STRUCTURAL SHAPES AND COLUMNS 680 lbs.
HEATING EQUIPMENT 640 lbs.
WINDOWS 800 lbs.
NAILS AND WIRE MISC. 600 lbs.
FRAMES, SILLS 480 lbs.
GUTTERS AND DOWNSPOUTS 475 lbs.
BATHROOM 300 lbs.
STEEL DOORS 160 lbs.
FLASHING AND MISC. SHEETS 200 lbs.
CONDUIT 140 lbs.
HARDWARE 90 lbs.
RADIATOR GRILLES 75 lbs.
SCREEN 32 lbs.
LAUNDRY TUBS 10 lbs.

MACHETES: Cut Wide Swath

Big knives still find wide use as Latin American tool and accessory . . . Hard wear, fine edge call for special steel, careful manufacture . . . Trade steady.

TROPIC undergrowth makes a machete a necessity in Central America. It becomes part of a man's right arm.

◆ MACHETE makers must produce a blade sharper than a carving knife but strong enough to hack away cane stalks and jungle. Traditional Latin American tool, the machete calls for precision manufacture, still provides a steady market.

Special cutlery-grade steel is the first element in machete quality for Charles D. Briddell Co., Crisfield, Md., a leading manufacturer of the big knives. Steel blanks are stamped two at a time to dimensions that will produce a finished blade about 20 in. long by 3 in. wide, curved or straight according to local style. The blanks travel 14 at a time into a grinding chamber.

An abrasive wheel grinds the blanks to shape: thicker at the base, tapering to a thin point. Ground blades go into an electric furnace for hardening and tempering, then cool in an oil bath.

Canvas rotary wheels grind the final cutting edge and plastic or wood handles are riveted in place. Handles must be the split type, revealing the full length of the blade base, or machete wielders complain the base has been cut off.

The finished machete, strong, flexible and sharp, is carefully wrapped and labeled for shipment.

Machetes have been pretty well domesticated since the first American shipment to the West Indies in the 1820's but blood grooves are still a feature of every blade. These longitudinal grooves facilitate removal of blades from unfortunate associates and remain at the insistence of tradition-minded planters.

Constant sharpening reduces machete life to about one season and makes for even demand, year in and year out.

Above-Left: MACHETE blades are stamped out of specially rolled steel, two at a time from a single sheet. Natives insist that the blade extend into the handle through its full length.

Above-Center: TEMPERING the blade for the tremendous punishment it will sustain in jungle and plantation is performed in a small electric furnace. Blades are lowered in racks for heat-treating.

Above-Right: MAGNETIC surface holds blades against an abrasive wheel which grinds machetes into tapered shapes.

Bottom-Right: BLOOD grooves of the blade's final form can be seen as blades await fitting and riveting machete's handle. Blade must show at the handle or superstitious natives won't buy.

TIMES SQUARE before (left) and after defense drill start. New York took cover but still millions were "killed."

Alert:

Steel, machinery plants hard hit in mock A-bomb raid.

Plenty of Federal agencies goofed in the mock alert. It took as long as 10 hours for some telephone and telegraph reports of "enemy damage" to reach Pres. Eisenhower's headquarters.

Sec. of the Treasury George Humphrey was one of the few officials reporting smooth sailing in the mobilization alert. He had plenty of extra money stashed away in various sections of the country to meet all emergency needs "for a good many weeks." His only problem, he said, was "how to get the money to the refugees."

Steel and machinery plants were among the hardest "hit" in the mock raid on 61 U. S. cities. According to mobilization planners assessing the "damage" done to each of the cities, heavy industry sustained grave losses.

Nearly one-half the steel-making capacity of some areas was "smashed" beyond quick repair, it is reported by the planners. This is especially true of closely built-up areas like Greater Pittsburgh and South Chicago where steelmaking is concentrated.

Plants turning out planes, tanks, and vehicles did not sustain such heavy losses because they are in most cases located in suburban areas. "Damage" was small in comparison with the pounding sustained by steel and machinery plants, it is said.

Mothballing:

Hoover group urges shake-up of industrial reserve.

Government's present system of mothballing plants and tools should be drastically shaken up, and some 100 plants should be disposed of, according to recommendations of the Hoover Commission on government organization.

The Commission, whose recommendations for cost savings are drawing fire from some congressmen, suggests that 100 of the 288 plants in the National Industrial Reserve—Army arsenals, Navy shipyards, and excess war plants—should be disposed of because they are either inactive or in poor physical shape. Some can be sold, and some should be written off as war costs, but none should be leased, the Commission says in its report.

Want Tools Returned

Acquisition cost of the plants was about $8.6 billion. The Hoover group recommends a board of industrial experts be called upon for advice on which plants to dispose of, and how disposition should be handled.

Jurisdiction over the government $6 billion worth of machine tools, the Commission says, should be taken away from the General Services Administration and returned to the Defense Dept. to improve administration.

Of the total, $3.9 billion worth are installed in government or private plants on government contracts, and the remainder are stored in private plants and warehouses.

Let Ship Contracts

Six tank landing ships (LST) will be built for the Navy at a total cost of $45 million by three shipbuilding firms in Ohio, Louisiana, and Virginia.

Scheduled to build two vessels each are the American Shipbuilding Co., Lorain, O.; Marine Ways, New Orleans; and Newport News Shipbuilding and Drydock Co., Newport News, Va. Five of the ships are within the fiscal 1955 program of the Navy. The sixth is a holdover from the 1954 program not yet completed.

Contracts Reported

Including description, quantity, dollar values, contractor and address. Italics indicate small business representative.

Flight simulator spares, $1,477,935, ACF Industries, Inc., Hyattsville, Md.

Float, minesweeping, 615, $1,323,184, The Replac Corp., Cleveland.

Float, minesweeping, 615, $1,223,198, General Textile Mills, Inc., New York, N.Y.

Nuclear equipment, 1 set, $250,620, Westinghouse Electric Corp., Washington, D. C.

Target assys, 10964 ea, $627,141, Lite Mfg. Co., New York.

• BRAINARD ELECTRO-GALVANIZED STEEL

Equipment:

Associated Spring spends $13 million for new facilities.

Associated Spring Corp., Bristol, Conn., has expanded $13 million since the end of World War II in a continuing plant facilities and equipment modernization program.

Of the total sum, more than $4.5 million has gone into the firm's three Bristol divisions.

$1 Million Mill

Current expenditures include $1 million for a new Sendizimir mill and related annealing equipment. Several years ago, more than $500,000 was invested in an additional rolling mill unit. Annealing furnaces costing $95,000 apiece have been installed on a regular basis during the modernization program.

Heavy investments by the firm have been made in new spring making and fabricating machines. Other new installations include high speed power presses, producing 25,000 to 30,000 pieces an hour.

Products in addition to spring wire fabricated by the divisions include extension and compression springs, textile steels, shim steel, watch spring material, and metal cutting bandsaw steel.

Drum Line Now Rolling

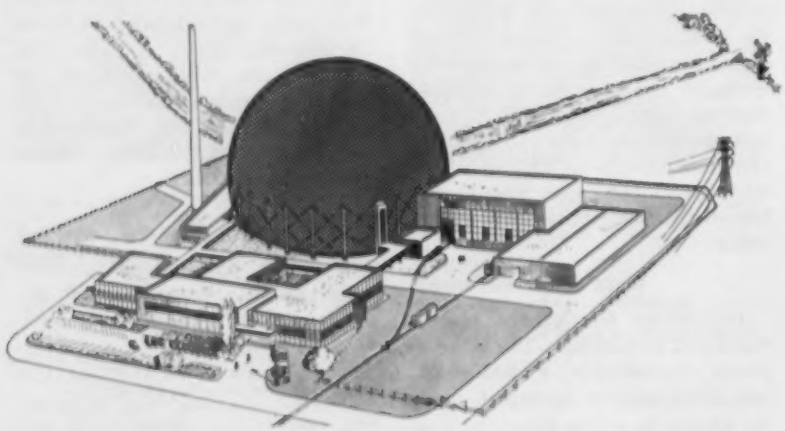
U. S. Steel Products Division's new Pennsauken Township, N. J., steel container plant has begun operation of its high-speed pail line and 55-gal drum line.

New plant output marks the third Delaware Valley operation started by the Corporation in the past 2½ years.

Steel drum and pail production will go to the petroleum, chemical, paint, food and other industries along the eastern seaboard.

Other plant facilities include a combination heavy-drum line and light-drum and grease-drum line.

Annual production is estimated at 2.3 million drums and 3.2 million pails.



A LOOK AT TOMORROW from Chicago shows how newly-planned area nuclear power plant will look when built. Slated for operation in 1960, new facility will cost an estimated $45 million to build.

Ford:

Another Expansion Round Gets Under Way.

A new expansion of Ford Motor Co.'s body stamping, engine and foundry in Cleveland costing probably in excess of $12 million was announced last week. The Buffalo stamping plant will also be expanded, it was announced.

In Cleveland the stamping plant located in suburban Walton Hills will get a 215,000 sq. ft. addition although the present new plant has not been officially dedicated as yet. With the portion completed last year, it will now total 1.5 million sq. ft. Completion of the new addition by the Austin Co. which is also enlarging the Buffalo plant is expected late this year.

The engine plant addition to be done by H. K. Ferguson will be completed early in 1957. The new Cleveland engine plant will be devoted entirely to production of V-8 engines and present six cylinder production facilities there will be moved to its second engine plant in Cleveland which will also continue to make V-8s.

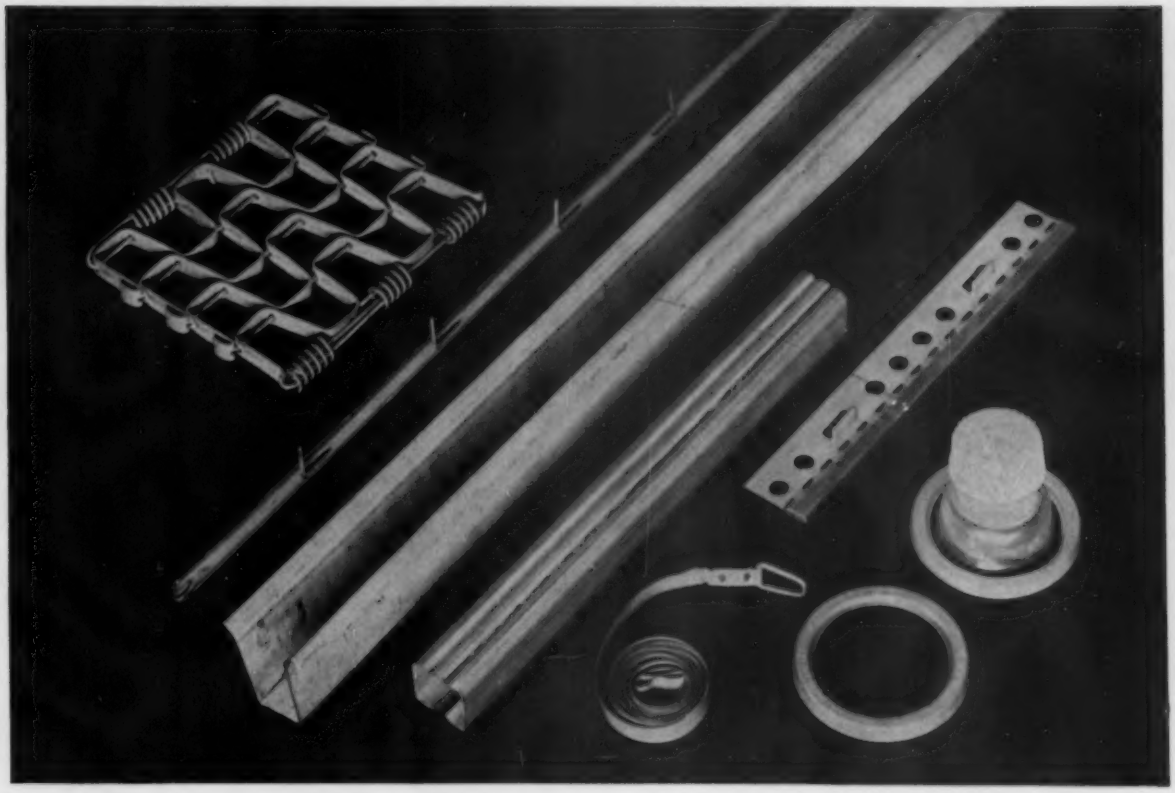
The new additions are part of a company-wide $625 million expansion program recently announced by Henry Ford II, president of the firm.

At the same time, a fourth postwar engine plant for Ford was announced for Lima, O. The company is negotiating for land north of the city where the new plant will be located. Production is scheduled for 1957.

Will Build Hose Plant

The American Brass Co., Waterbury, Conn., has broken ground for a $2.5 million flexible metal hose and tubing plant at Mattoon, Ill. Production will start next year.

● BRAINARD ELECTRO-GALVANIZED STEEL



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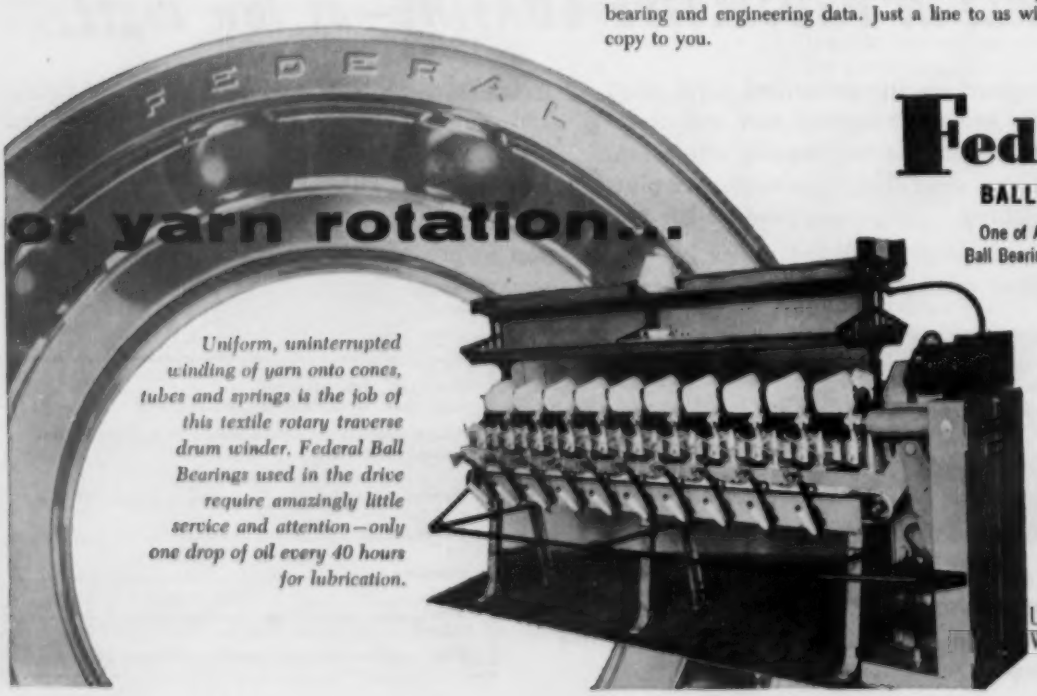

Uniform, uninterrupted winding of yarn onto cones, tubes and springs is the job of this textile rotary traverse drum winder. Federal Ball Bearings used in the drive require amazingly little service and attention—only one drop of oil every 40 hours for lubrication.

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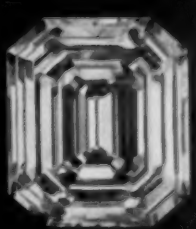

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Report To Management

Big Government Is Here To Stay

If you are a typical business executive, you have been fighting big government for the better part of the past two decades. It has been like betting against Notre Dame or the Yankees.

Even the change in administration didn't completely reverse the trend. And where the federal government stepped out, state and local governments stepped in. Future budgets are not likely to be much smaller and the role of government in our economy is not going to diminish.

National Bureau of Economic Research points out that government is a major factor in today's economy, as a major user of the nation's supply of labor and other resources, a source of the national income, and a force in distribution of income.

It's important to understand this in relation to your own business operations, and not just in relation to your tax bills or legislation.

Government Spending Is Tremendous

President's budget called for $62 billion. State and local government budgets for 1956 will add perhaps $35 billion. Total government budgets will approach $100 billion.

Disregarding philosophy and theory on government spending, here are some cold figures to take into account: Last year 15 pct of all workers were employed by the government. Seventeen pct of all personal income came from the government.

Government accounted for 38 pct of the nation's expenditures for new construction and equipment. The government held close to a fifth of the nation's total stock of capital goods, including military equipment.

Purchases for goods and services by governmental units ran to $46 billion in 1954 and government products equaled about a fifth of the gross national product last year.

There are 10 million people on government payrolls, government holdings and assets come to some $200 billion and government debt is near $300 billion.

Payments to individuals are a big part of nondefense spending. A full fourth of nondefense outlay is in this category. It includes veterans benefits, public assistance, pensions, unemployment compensation, old age and survivor insurance payments, not to mention agricultural price supports, subsidies to industries such as merchant marine, airlines, etc.

Repercussions from Detroit

Other industries faced with the problem of negotiating labor contracts can learn a few things from close study of automotive contracts.

It is easily overlooked that auto companies may have made a good bargain. Economist Eliot Janeway, for one, points out that Ford obtained a funding schedule that was on the conservative side. He calls it a "bargain" to be able to build up the GAW fund in advance, during good times, and insulated from the corporate balance sheet.

As insurance against labor trouble for 3 years, it was a bargain for Ford and GM. Both will have stable employment and little risk of rapid diminishing of unemployment funds.

This won't help others who have not been able to keep up the pace in automotive or other industries. The principle of limited company liability is the major consolation and bargaining insurance of those who will have to face the problem in the next year.

INDUSTRIAL BRIEFS

New Mill . . . Construction work has now begun on the Atlantic Steel Company's new merchant bar and rod mill at Atlanta. As general contractor for construction of the new mill, the Rust Engineering Co. will design and erect both the mill building and warehouse building and will install all mill machinery and equipment.

Contract for Aluminum . . . A contract for the porcelain enameling of aluminum sheets and extrusions for the aircraft carrier *U.S.S. Saratoga* has been received by Ingram-Richardson Manufacturing Co. The *Saratoga*, a carrier of the *Forrestal* class, is under construction at the New York Naval Shipyard in Brooklyn.

New Building . . . Construction began last week in Chicago on a research building which will house the nation's first private nuclear reactor for industrial research. The building is the latest addition to the facilities of Armour Research Foundation of Illinois Institute of Technology.

New Bar Mill . . . A contract for the manufacture of a bar mill in New England, their first, was awarded to the Birdsboro Steel Foundry & Machine Co. of Birdsboro, Pa. The specialty merchant bar mill was ordered by Northeastern Steel Corp. for its plant in Bridgeport, Conn.

New Addition . . . The construction of a new engineering and research building by Goodyear Aircraft Corp. in Akron, Ohio, is scheduled to begin immediately. The new engineering and research building will be a three-story, modern concrete and steel construction.

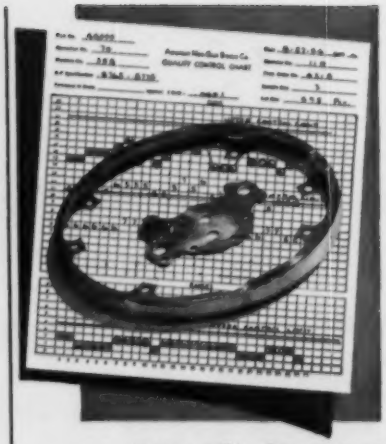
Gold Mine Sale . . . What is believed to be the only channel mining gold property still being operated in this country was sold to Basic Minerals Syndicate of Salt Lake City. Announcement of the sale came from Hugh Tuttle, cotrustee of the syndicate, who said the purchase was made from Ella Maria Wickham and Otto Brink.

New Subsidiary . . . The Newark Electric Co., Chicago, announced the purchase of Acorn Radio and Electronics, Inglewood, Calif. It will be operated as a wholly owned subsidiary under the name of Newark Electric Company of California. This purchase was the third step in Newark's expansion program.

Expansion . . . The Snap-on Tools Corp. of Kenosha, Wisconsin will add 45,000 sq. ft. of floor space to its plant in Mount Carmel, Ill., under a contract just awarded to Luria Engineering Company of Bethlehem, Pa., designer and producer of standardized steel structures. The addition is scheduled for completion some time in September.

Bought Out . . . Clevite Corp. is purchasing Wallace Aviation Corp., manufacturers of jet compressor blades in Wallingford, Conn. Clevite has also been active in jet blade development work, through its largest operating unit, the Cleveland Graphite Bronze Company.

A Real Blooper . . . Kaiser Steel Co. did a much faster relining job on its No. 2 blast furnace than was indicated in the issue of June 2. The relining was completed in 34 days and not 43 days as carried in earlier story. A. E. Anderson Construction Corp. was the contractor.



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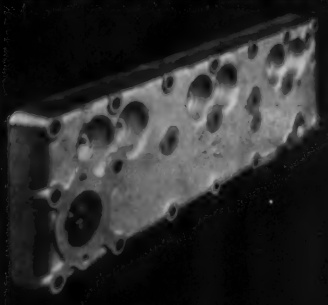

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The application of TOCCO* Induction Heating to the surface hardening of rear axle drive shafts for passenger cars and trucks provides a fine example of how a less expensive manufacturing method often results in the best possible end product.

For instance, TOCCO* Induction Hardening permits the substitution of easier machining carbon steels for expensive alloys, saving from 25¢ to 55¢ per car in material costs alone. Additional savings result from the fact that TOCCO eliminates the need for annealing, tempering and shot peening operations formerly required. Moreover, long hauls to and from the heat-treating department are eliminated because cool, clean TOCCO* fits right in the production line—next to related operations.

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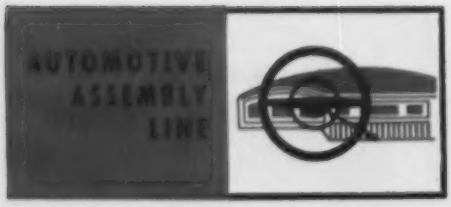


Autos Are Front Line Atomic Defense

Family car can save lives in event of nuclear attack . . . Evacuation and movement from radiation fallout pattern are major defense uses . . . Cars provide some shelter . . . GM studies corrosion—*By T. L. Carry.*

◆ IN CASE the city in which you live was subjected to an atomic attack, your car can save your life. Large cities, like Detroit, could be destroyed by a nuclear bomb, but there is no reason why people living in cities could not escape, according to Val Peterson, director of Federal Civil Defense Administration.

Mr. Peterson says the family car can save many lives by completing the evacuation of cities in case an attack threatens.

Five Mile Line . . . Mr. Peterson points out the population of a large city could move by car outside the 30-40 mile radiation fallout pattern of a nuclear weapon in a short time and also obtain some form of shelter from the auto.

The former governor of Nebraska warns that there would be absolutely no protection within a 5-mile radius of the point of impact of a bomb sufficiently large to destroy a city the size of Detroit.

But he adds that with sufficient warning and an accurate prediction as to which direction a fallout pattern would take, a whole city could be evacuated by car.

If an attack comes, the family car can be converted into a substitute home.

Family Plan . . . The auto can provide shelter from the elements. Its heater will protect the occupants from cold. A car radio, tuned to "Conelrad" stations at 640 or 1240 on the dial, can keep people informed on latest developments and tell them when it is safe to return home. The trunk of a car can be converted into a mobile pantry for storage of canned foods. In addition, a first aid kit can also be stored there.

Mr. Peterson urges every American family to have a plan for evacuation in case of an attack. A prearranged meeting place, far from the target area, also should be decided upon, he added.

He urges motorists to keep their cars in top running order with the gas tank always at least half full. "There is no time for minor repairs or filling the tank when the siren goes off," he warns.

Occasion for Mr. Peterson's remarks was the showing of "Escape Route," an educational film outlining the evacuation of a major city by automobile. It was produced by the National Automobile Dealers Assn. in cooperation with FCDA.

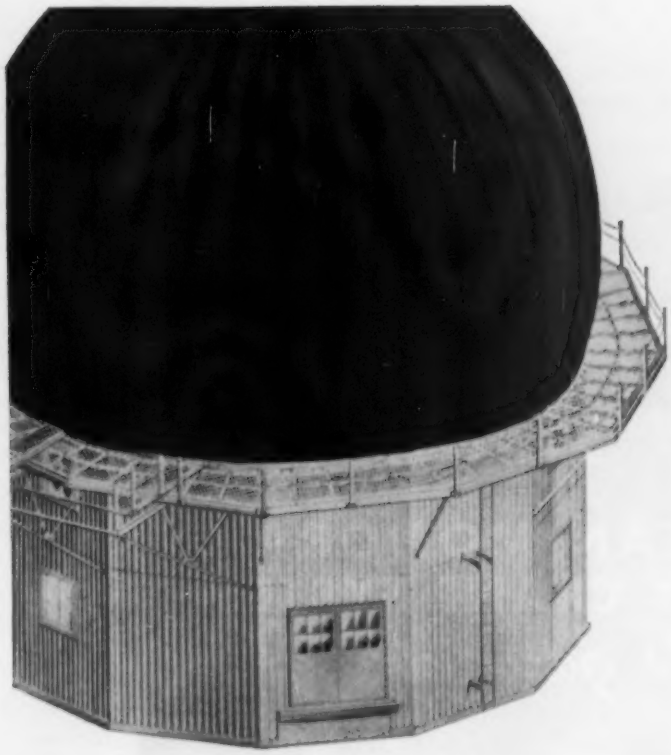
"Escape Route" is presently being made available for public showings to television stations, schools, churches and civic organizations throughout the country.

TECHNICIANS study rust accumulation on auto body sheets in GM Research Lab. corrosion tests. The 20-day test equals 3 years' exposure.

Aluminum Yarn . . . Threads of metal of almost every color, may soon be used in the manufacture of auto tires. The metal yarn is already used in automobile upholstery to provide sparkle. But in tires, its use will be entirely functional.

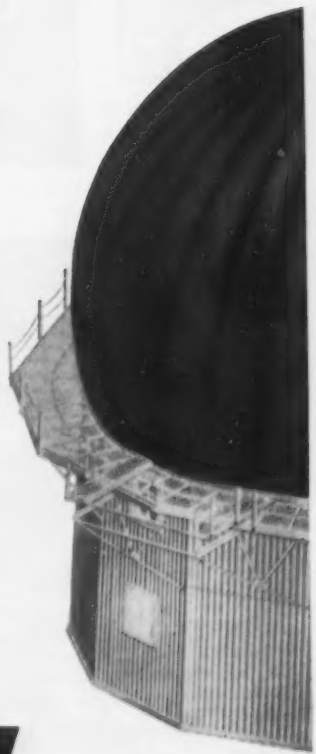
The threads can assist in reducing heat which has always been a big problem in tire construction. The yarn can assist by dispersing heat in high speed highway operation.

Reynolds Metals Co., which has



ON GUARD above the Arctic Circle, Air Force radar station features flexible neoprene-and-fiberglass dome which pulsates to dislodge ice and snow.

Radar dome shrugs off 100-mph gales at sentry post on roof of the world!



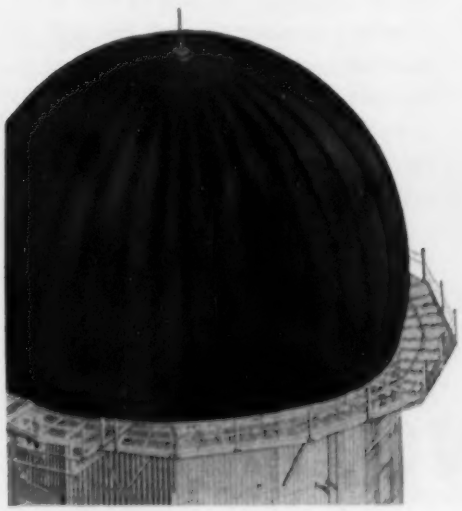
RB&W bolts hold tight on critical fastening job

You'll never read a headline about RB&W bolts and nuts in U. S. Air Force radar domes strung across the top of the world. But the men who build the odd-shaped structures—Dresser-Ideco Co. of Columbus, O.—know that their ability to withstand the cruelest weather on earth stems largely from these work-a-day fasteners.

C. Daniell Byrd, Dresser-Ideco's sales promotion manager, puts it in these words:

"Keynote of our planning is rugged construction. RB&W bolts offer superior size and dimensional stability. Since the parts *must* fit, RB&W's consistent product uniformity adds an essential 'plus' to the strength and performance of these bolts."

Maybe your product doesn't have to withstand 100-mph Arctic blasts. Wherever it's used, however, it will do a better job for a longer time if you put it together with RB&W fasteners. We'll be glad to show you how. RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY, Port Chester, N. Y. 4.12



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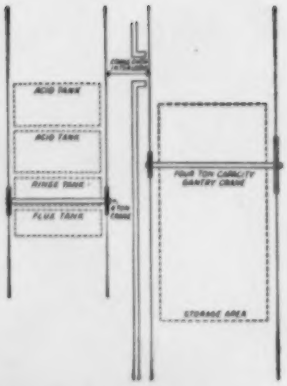
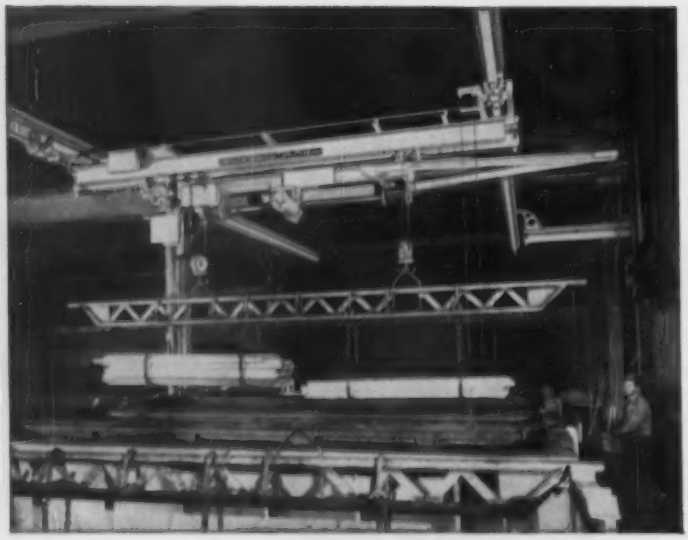


AMERICAN MONORAIL GANTRY CRANE SYSTEM *speeds galvanizing!*



Steel fence posts travel from fabrication to galvanizing over a gantry bridge which interlocks at a crossover track through doorway for passage to the MonoRail crane serving the tanks in the plating room.

All travel on the 4-ton system is motor operated and controlled by push-button station in the operator's hand.

Here is truly team-work handling that results in cost savings as well as increased tonnage through the galvanizing process. It is a typical example of American MonoRail engineering available at no obligation for the solution of your handling problems.

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AMERICAN MONORAIL COMPANY

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Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
June 18, 1955	156,561*	27,426*
June 11, 1955	145,316	27,478
June 19, 1954	118,663	21,400
June 12, 1954	118,191	21,121

*Estimated Source: *Ward's Reports*

a patent on aluminum fiber for tires, has been experimenting with the application for several years. Until recently defense requirements held back progress, but now the company believes this market will be an important part of the aluminum business.

Corrosion:

GM Tests Supply New Data in Anti-Rust Fight.

An indoor test that speeds nature's corrosion of auto body steels may supply the answer to the problem of retarding rust and prolonging the life of steels.

The test was developed by General Motors Research Laboratories Div. Results of the tests showed that 2 types of rust attack body steels, one protective and the other non-protective.

In what was called a cyclic humidity accelerated corrosion test, GM researchers suspended bare steel panels in a constant temperature cabinet at 125°F. The panels were rusted by passing humid air over them in cycles ranging from 100 to 10 pct for 8-hour periods.

Can Protect

In addition, the panels were wetted down each day with a dilute salt solution. Every humidity cycle produced a new layer of rust and in 20 days the same amount of rust was produced that ordinarily would take 3 years to accumulate in normal outdoor exposure.

Of the two types of rust that develop on body steels, the first forms on the exterior where paint has been chipped or scratched off. This type can be controlled by waxing or painting, but even if it is not treated, it forms a protective coating and retards further corrosion.

The second, or non-protective type, occurs at hidden and inacessible places in an auto body where moisture cannot escape. This type eats into the metal.

To solve the problem of non-protective rust, engineers are seeking a low cost additive or combination of elements in steel that will increase its resistance to corrosion.

GM Shows Power

General Motors Corp., well known for its Motorama throughout the country, will turn from its consumer products of automobiles and home appliances to display the latest in land, air and marine equipment produced or powered by its diesel, aircraft and heavy equipment divisions.

A giant outdoor show to be called General Motors Powerama and covering over 1 million square feet of space will be staged on Chicago's lake front from Aug. 31 to Sept. 25 this year.

In addition to exhibits featuring a saw mill, earth mover, cotton gin and fighter plane, a regular stage show is also planned.

AUTOMOTIVE NEWS

One of the outstanding exhibits of the Powerama will be a light weight passenger train designed at the request of a committee of railroad presidents. The train, which is diesel powered, will be able to carry 400 passengers at speeds of over 100 m.p.h. for sustained stretches. (THE IRON AGE, June 9, 1955, p. 38).

Among the marine equipment to be displayed is a U. S. Navy submarine, a pleasure ship and a shrimp boat.

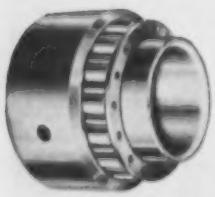
Aim of the Powerama, according to Harlow H. Curtice, president of GM, is to tell the story of how diesel and gas turbine engines have given the nation new sources of power in the field of transportation and construction.

It also indicates that GM is placing more emphasis on its non-automotive side of the business, which tends to be overlooked by the public when compared to the company's five lines of automobiles.

THE BULL OF THE WOODS — **By J. R. Williams**

TH' BULL O' TH' WOODS HAS TRIED EVERYTHING TO KEEP PEOPLE FROM STAYIN' TOO LONG--NO EXTRA CHAIRS AND HIS DESK FIXED SO YOU CAN'T LAY ON IT--BUT HE FORGOT THAT NON-SKID PEBBLE-GRAINED WALL!
YEH, AND WITH RUBBER HEELS THEY JUST SIT DOWN COMFORTABLY IN TH' SEAT OF THEIR PANTS--NOW HE'LL HAVE TO HAVE TH' WALLS DONE OVER IN SLIPPERY ELM FINISH!
J.R.WILLIAMS 6-24
THE STICKERS

DIRT, HEAT, BRUTAL SHOCK LOADS— BUT HYATTS JUST KEEP ROLLING ALONG!



Keep your production rolling profitably with

You're looking at a mighty tough spot for a roller bearing—the 7-inch axles of an ingot car that carries an 80,000-lb. load. That's why we think it's significant that the steel industry has *far more HYATTS on ingot and charging cars than any other make.*

Take these at Jones and Laughlin Steel Corporation's Cleveland Works, for instance. J & L has found that: HYATTS greatly reduce friction and starting power needs—permit longer trains, faster and smoother car spotting. HYATTS operate dependably despite abrasive dirt, constant heating and cooling, and pile-driver shock loads when the stripper has to pound 10-ton ingots free from the molds. Their straight cylindrical design permits lateral expansion without cramping rollers, and ample reserve for overloads. HYATTS *virtually eliminate costly downtime.* Month after month, they absorb this brutal beating and keep coming back for more! Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey.

HYATT

STRAIGHT BARREL TAPER

ROLLER BEARINGS

THIS WEEK IN WASHINGTON

U.S. Nails Down Foreign Aid Stand

New aid boss dispels hopes and fears of cut . . . Program permanent. $3.5 billion for fiscal '56 . . . India, Tito get cool looks but State Dept. warns against nudging into Iron Curtain—By G. H. Baker.

◆ SPENDING for foreign aid is to remain at a high level in the fiscal year ahead, despite some sharp questioning the give-away program is getting from Congress, from the Hoover Commission, and from John B. Hollister, the new overseas aid boss.

Fears have been expressed by some Truman holdovers in the Eisenhower Administration that Ike's naming of a Robert A. Taft Ohio Republican like Mr. Hollister could only mean that drastic trimming of foreign aid was being planned.

That's not the case, it is now evident. Mr. Hollister tells Congress he is "100 pct" behind the President and all his policies, including foreign spending.

Won't Shift Policy . . . Foreign aid programs are quietly becoming a permanent part of government policy. True, they are reviewed and rewritten each year by the Congress. But big-scale foreign assistance is now in its sixteenth year, and neither political party shows any disposition to shut it off—or even to whack it down substantially in size.

In the fiscal year starting July 1, the U. S. foreign aid will amount to $3.5 billions in military aid, equipment, technical aid, and in outright handouts. There's some minor quibbling as to whether Tito ought to get his full share, now that he's playing footsie with Moscow once more.

But a check of opinion among congressmen shows only shrugging unconcern over this issue. Evidently, Tito will get most of what he asks. To try to stop or slow up foreign aid today is like one man trying to stop a steamroller, as one congressman puts it.

Who Rates Aid . . . It's far more important to world peace to continue U. S. assistance to Yugoslavia and India than to cut them off because of pro-Communist activity, the State Dept. believes.

Foreign experts point out that Moscow is trying hard to set up a "neutral bloc" of on-the-fence nations which would eventually be nudged over to the Communist side. Best bet for this country is to spend more, not less, on machinery and farm products for Yugoslavia and India, they say.

But the Senate and House are beginning to view with a fishy eye the contention that friendship can be bought. Past gifts have drawn grudging gratitude at best.

"Has something to do with an item on your account."

Speed Atomic Planes . . . Development of a practical atomic-powered airplane is now a lot closer at hand, due to recent engineering developments that the Atomic Energy Commission refers to cryptically as "a new approach to the problem."

Further details are still shrouded in official secrecy. But the AEC is asking Congress for about $38 million to push the program, and explains that "developments which have taken place in the last year" indicate that a fast follow-up in the further development and testing of atomic aircraft is due.

Actual construction of atomic planes evidently is still a year or two away, but the hints of progress in producing a workable A-plane suggest that big-scale procurement is not nearly as far away as was formerly thought.

Halt Auto Mergers . . . Further mergers in the automobile industry have been called off. Threat of government intervention is the reason. Government antitrust lawyers aren't saying so officially, but they have drawn a chalk-line against any further auto mergers for the next 2 years.

Theory of the 2-year "freeze" is that at least that long is needed to find out if last year's small rash of mergers among so-called independents is actually (as claimed) going to stimulate competition in the auto industry by permitting sturdier independents to compete with the giants.

Says Shipping Lags . . . Tonnage of ores brought to the United States in U. S. ships probably will

Life of These Punches Went Up

350%

with

Ludlum DBL-3
High Speed Steel

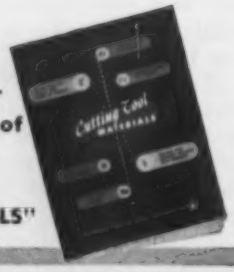
Application of Special Heat Treatment Did the Trick:

These DBL-3 punches (2⅞" dia. by 10½" long) are used to draw and flatten hot or cold rolled stock .140" thick. With conventional heat treatment, their performance was 25% better than Material B and 50% better than Material C. But A-L Metallurgical Service recommended the *additional* heat treatment listed below, improving the performance of DBL-3 to 150% over B *and 350% over Grade C!*

1. Carburize at 1950°F
2. Oil Quench
3. Draw at 1025°F
4. Draw at 1025°F again
5. Finish grind
6. Draw at 750°F to relieve grinding stress
7. Nitride 72 hours at 950°F (case depth of approx. .015)

Ludlum DBL-3 holds a fine grain over a wide hardening range. With its higher carbon and vanadium content, it also has better abrasion resistance than other standard high speed tool steels. Our Metallurgical Service is ready to help improve *your* production operations, too. Just call our nearest branch office, or write *Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.*

Write for your copy of "CUTTING TOOL MATERIALS"



This 36-page booklet analyzes and compares all A-L grades: carbon, high speed, cast alloy and carbides. Includes data on handling and treatment . . . invaluable for production men.

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AL
FINE TOOL STEELS
SINCE 1854

decrease still further in the immediate future unless the Maritime Administration moves quickly to help U. S. shipyards and shipping companies offset competition from abroad.

Chairman Magnuson, D., Wash., of the Senate Commerce Committee, issued this warning, and reminded the government's marine planners that other nations are building the new, large ore carriers that will have to be relied upon in the future.

British yards are building three ore carriers, Japan is building eight, and Sweden is building one —all for U. S. firms.

Sen. Magnuson calls upon the Maritime Administration to start making full use of the Merchant Marine Act of 1936 by offering construction subsidies to offset the cost differentials and offering operating subsidies to place U. S. ships on a parity with low-cost foreign operators.

Close Tax Loophole

President Eisenhower has signed into law a bill closing loopholes in the 1954 tax code. The new law prevents business firms from getting an unintended windfall that the Treasury Dept. estimates would amount to more than $1 billion. The law cancels retroactively two accounting provisions of the new code. It gives business firms until next Dec. 15 to make up any back taxes as a result of the retroactive repeal.

Repealed are provisions which allowed firms to deduct from taxable income funds put in reserve to meet estimated future expenses and to defer tax payments on income received for services to be performed in future years.

The provisions were originally proposed to make tax accounting conform generally with business accounting, but the Treasury later decided it was a "grave mistake."

Urge Smog Study

Industrial plants are going to be one of the main "research grounds" if Congress approves $25 million for a federal program to aid the states in tackling their air pollution problems.

Suggestion for the study was made by a special interdepartmental committee on "community air pollution," named by Oveta Culp Hobby, Secretary of Health, Education and Welfare — who would like to administer the program. Representatives of the Departments of Welfare, Agriculture, Commerce and Interior, plus the Atomic Energy Commission and the National Science Foundation, are on the committee.

The report urges the federal government to aid state and local agencies by conducting and supporting all phases of the program.

Inflation:

Boom heads for price surge, U. S. plans checks.

Government officials who handle the nation's economic throttle are warily eyeing a new threat to prosperity and economic stability —inflation.

Rising cost of labor and surging demand for finished goods are putting strong pressure under raw materials prices. Result may be an upward spiral of prices that could put the squeeze on high-cost manufacturers and seriously threaten the current state of industrial prosperity.

Mushrooming demand for finished products, coupled with the rising wage pattern, means that deliveries are delayed on more and more raw materials. This permits and tends to cause price rises.

"Simple, isn't it? Just twist and pull."

WASHINGTON NEWS

Government observers believe price hikes are coming in steel, copper and aluminum scrap, zinc and lead, paper and paperboard, chemicals, some building materials and cement, some textiles, machinery, and possibly in primary aluminum, copper, nickel, and chrome.

Rising prices in raw materials of a few percentage points will mean slightly higher costs of some finished goods, higher wholesale prices, and higher prices at retail —price hikes at the source tend to pyramid as each level of distribution adds the original increase plus a percentage for its own profit.

Inflation, replacing the fear of a let-down, is worrying the government and the politicians for its possible effect on next year's election and on defense buying and taxes if it gets out of hand.

Rubber:

U. S. nets $10 million on plant sale.

Government will realize a net profit of about $10 million from sale of the synthtic rubber industry to private ownership.

According to a report of the Rubber Producing Facilities Disposal Commission, the net book value of the 27 synthetic rubber plants and other assets, after allowing for depreciation, is estimated at $128 million. The government's operating deficit since production began during World War II is about $133 million.

Sale of the plants will bring the government some $271 million, plus about $145 million for inventories, spare parts, finished rubber, and additions to the plants. In all, some $415 million will be turned over to the Treasury Dept., including cash from the operating fund of the plants.

The government is now negotiating for the sale of some, or all, of 447 pressure tank cars.

Mountains of Basic Raw Materials

At Your Door

in "Treasure Chest" Land

One fact stands out in any appraisal of the vast Utah, Idaho, Wyoming and Colorado area served by Utah Power & Light Company: No other area so well situated in relation to plant sites and growing markets has such a rich and diversified store of the raw materials needed by modern industry. Many of America's top industrial firms, after careful study of the potentialities, have set up operations here. This "treasure chest" area merits the study of any industry planning to compete on a favorable basis for the rewards of our growing economy.

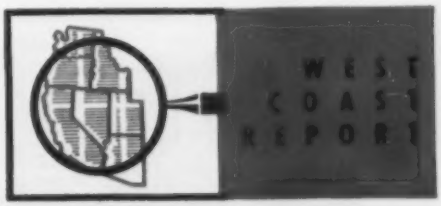
- Every major basic raw chemical.
- 60% of U.S.A. phosphate reserves.
- One-third of nation's copper.
- Largest proved uranium reserves in the nation.
- Greatest concentration of non-ferrous metal mills, smelters, refineries in U.S.A.
- Largest steel mill west of Mississippi.
- 214 different minerals.
- Low-cost power, water, fuel.
- Intelligent and stable labor force.
- Sound diversified economy.
- Healthful climate with low humidity.
- A gateway to the rich, far west market where America is growing fastest.
- Plus . . . plenty of "elbow room."

Ask for copy of
"A Treasure Chest in the Growing West"

Detailed information is presented in this Area Resources Brochure. Write, wire or telephone for a copy. Inquiries held in strict confidence. Address: W. A. Huckins, Manager, Business Development Department, Dept. F, Utah Power & Light Co., Salt Lake City 10, Utah.

UTAH POWER & LIGHT CO.

A Growing Company in the Growing West



Airlines Place Fat Transport Orders

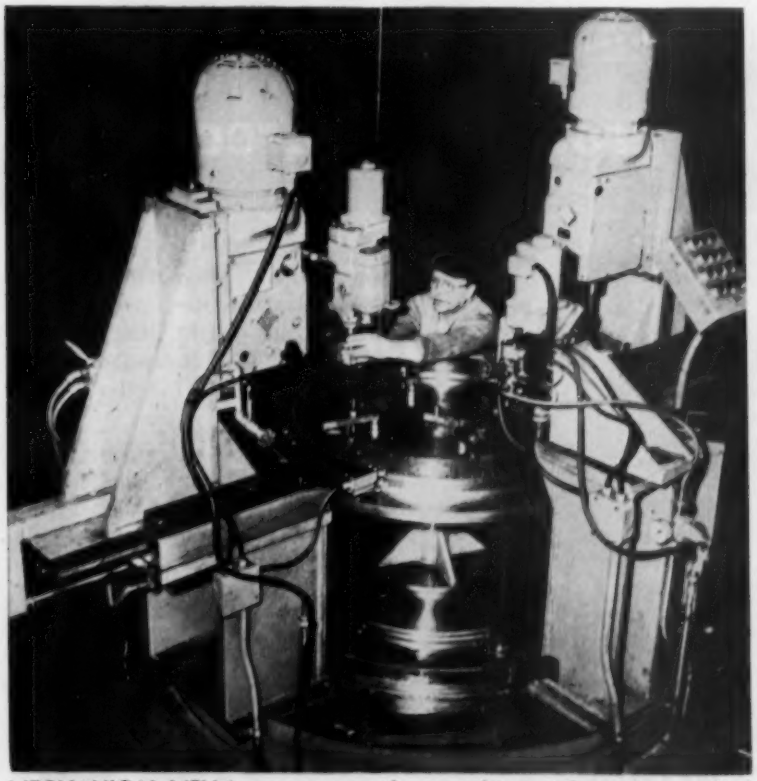
Southern California firms have $750 million on the books . . . More orders expected in near future . . . Competition tough between Douglas and Lockheed . . . Pan Am places $110 million order—*By R. R. Kay.*

◆ AIRCRAFT industry suppliers throughout the country can look for a steady flow of orders from West Coast aircraft builders. It will come from booming business in commercial transport production.

$750 million is on the books of southern California firms today. And over 40 pct of the builders' sales dollar goes for material and equipment purchases and various types of subcontracts.

Commercial transport backlogs are swelling. Watch for huge additional orders in the next few weeks.

Competition is hot. Two big manufacturers are staging a knock-down-drag-out fight for the business. And they're thriving on it. Douglas Aircraft Co., Inc., Santa Monica, Calif., and Lockheed Aircraft Corp., Burbank, Calif., will be busy through 1959.



MECHANICAL MEN in appearance, these machines at Ryan Aeronautical Co., solve the problem of drilling 150 holes and machining 60 scallops.

American Buys . . . Douglas just got its airworthiness certificate for the DC-7B. And it has a $110-million contract to supply this model to Pan American World Airways. Backlog for commercial propeller-driven aircraft is nearly $500 million—enough to keep Douglas's Santa Monica plant busy through 1958.

Lockheed has a new four-engine turboprop passenger plane, the Electra, equipped with Allison 501 engines. American Airlines bought 35 of them for $65 million. Cruising speed of 414 mph makes the Electra 100 mph faster than any commercial passenger turboprop plane in the air today.

And Lockheed nabbed new orders for Super-Constellations: $32.5 million from Air France and $70 million from Trans World Airlines.

Boeing Plans Uncertain . . . To add fuel to the competition, Douglas says it will build the country's first passenger jet transport, ready for airlines in 1959. It's a four-engine swept-wing DC-8, to carry 80-125 passengers at 550 mph. Power will come from an advanced version of Pratt & Whitney's J-57 engine. Non-stop flight time Los Angeles-New York will be 4½ hrs, New York-Paris, 6½ hrs.

Boeing Airplane Co., Seattle, is a big question mark in the commercial field. Will the company be able to produce any jet transports during the life of its $750-million U. S. Air Force contract for jet tankers? A high USAF official says no to commercial versions before military need is met.

16 surfaces

...on this Garrison Gear Chuck

THE BODY
(soft semi-steel)

THE CONTROL RING
(soft tool steel)

AND THE 6 JAWS
(hard tool steel)

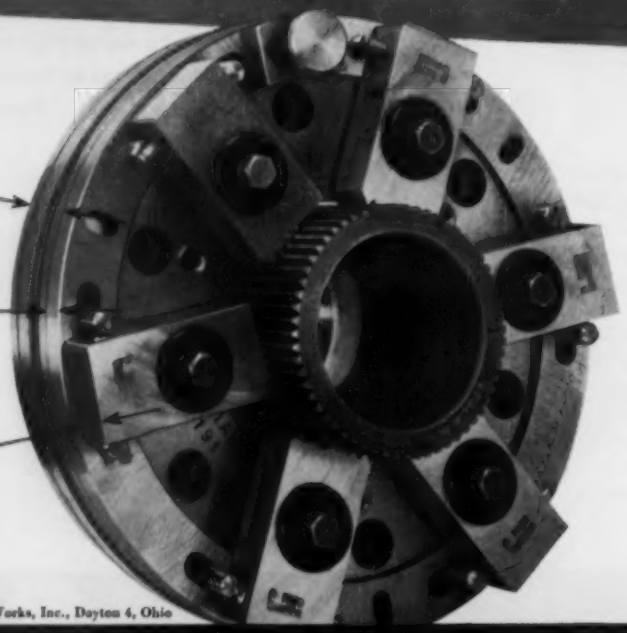


Photo courtesy of Garrison Machine Works, Inc., Dayton 4, Ohio

are Blanchard ground for precision

As every machinist knows, machine tools impart their precision through their chucks. That's why chuck dimensions and tolerances are of critical importance . . . and why Blanchard Surface Grinders are commonly used to produce the flat surfaces required.

Blanchard Surface Grinders are ideal for all kinds of precision grinding jobs. They produce extremely close tolerances for flatness, size and parallelism . . . *at low costs and high production rates.* Many Blanchard users grind surfaces flat to within 2 to 4 light bands, parallel to less than .0001", with dimension tolerance of .0002", and surface finish to better than 3 micro inches.

Whether your work involves precision machining or rapid removal of stock, take the advice of master machinists . . .

PUT IT ON THE BLANCHARD

No. 11 Blanchard Surface Grinder

Send for your free copies of "Work Done on the Blanchard", fourth edition, and "The Art of Blanchard Surface Grinding".

PUT IT ON THE BLANCHARD

THE BLANCHARD MACHINE COMPANY

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MACHINE TOOL HIGH SPOTS

Builder Bets Heavily on New Machine

Brown & Sharpe sets up specialized production line for new screw machine . . . Mechanized production cuts building, training time . . . Outlay calls for heavy sales volume—By *E. J. Egan, Jr.*

◆ VISITORS to the recent preview demonstration of Brown & Sharpe's new screw machine also saw something new in machine tool manufacturing methods.

The company's faith in its latest machine tool design is being backed up with a permanent, mechanized, production and assembly facility. Idea for the integrated screw machine manufacturing setup is patterned after the automotive industry's mass output methods.

Most machine tool builders who make several types of equipment are expert at juggling production schedules. Big users of general purpose machine tools, they retool these units whenever a new part run comes down the line. But new setups take time and cost money. And whenever a rush order gets jammed into production, a few of the earlier delivery promises might have to be revised.

Want No Delays . . . Brown & Sharpe intends to avoid all possible delays, tooling changeovers and slow delivery apologies in its planned multi-million dollar screw machine line. All components will flow in an uninterrupted path to final assembly and the shipping platform.

Essentially, each operation on each screw machine parts will be performed on a separate machine. Standard machine tools will be used wherever possible. But where a special machine tool or a special setup will do the job more efficiently, in the line it goes.

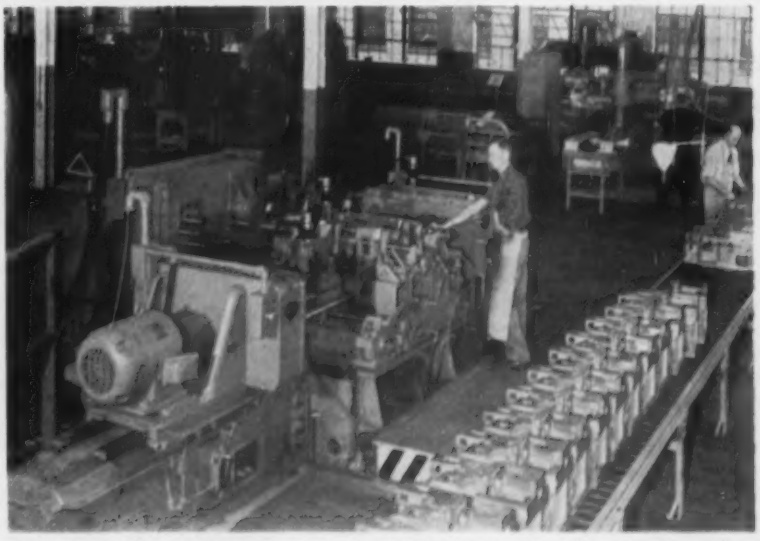
As an example, a special machine drills the speed cases for the new screw machine in just 12 minutes floor-to-floor time. Speed cases for the old models were processed on radial drills that took 2 hours to do the job. Put a number of such examples together and you get some eye-opening time savings.

Castings Move Faster . . . It used to take 16 weeks to move screw machine bed castings from the foundry to the assembly floor. Now the same job can be done in just one week. Just as soon as any machining phase is finished, the workpiece is air-hoisted out of its fixture, lowered onto a conveyor and whisked to the next in-line operation.

In a setup like this the machine operators don't have to be highly skilled, all - around craftsmen. Tooling, fixtures and automatic machining cycles are preset, ready to go as soon as the work can be loaded and the "start" button pushed. This philosophy of simplification has reduced by more than a year the experience factor B & S requires of workers doing screw machine production.

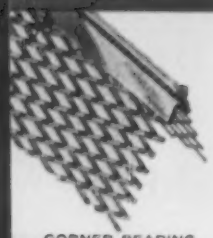
Cuts Training Time . . . This worker-experience item is important. It means that the firm can train fully-qualified machine tool operators in much less time than formerly. And in case of a national emergency when screw machines might be needed in huge quantities, the benefits of fast worker training are obvious.

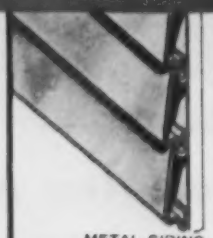
At present, the company isn't pressure-training employees.

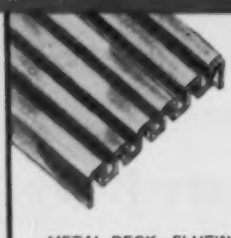


SECTION of separate manufacturing facility devoted exclusively to production of new-design Brown & Sharpe screw machines. Multi-million dollar setup features efficient handling methods, many special machine tools.

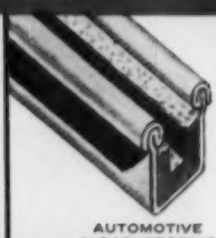
The Shapes of Things to Come


CORNER BEADING


METAL SIDING


METAL DECK—FLUTING

STAINLESS—GALVANIZED TRIM

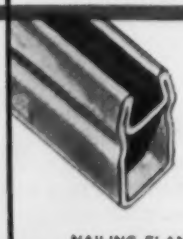

AUTOMOTIVE WEATHERSTRIP

RACEWAYS

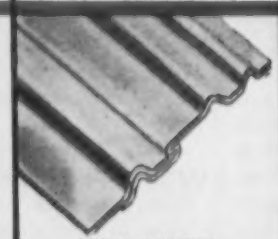
LOCK SEAM TUBING

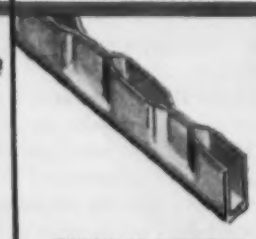
WINDOW SECTIONS

MOULDING


NAILING FLANGES

LOCK SEAM BOX SECTIONS


METAL ROOFING


IRREGULAR PATTERNS

COATED METAL PRICE STRIPS

SHEET and STRIP FLANGING

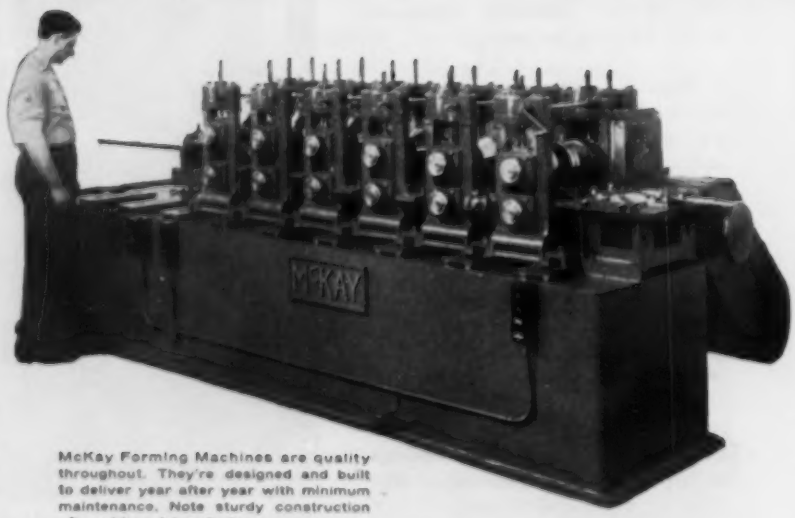
Call for McKAY FORMING MACHINERY

Two words that best describe McKay Forming Machines are "precision" and "ruggedness."

McKay Forming Machines are the last word in quality. They're designed and built to perform with extreme accuracy year after year. McKay users the world over know that quality is never sacrificed, even in the smallest details, for the sake of marketing a "cheaper" unit.

And McKay Forming Machines are built to customers' requirements with an eye to the future. They're machines that will not only meet today's needs, but machines that are ready for the faster speeds, tougher metals and more intricate shapes of tomorrow.

Be sure you have checked with McKay before you order forming equipment. You'll find this unmatched precision and ruggedness pays off in better forming at greatly reduced costs. And with a McKay—you're ready for tomorrow!



McKay Forming Machines are quality throughout. They're designed and built to deliver year after year with minimum maintenance. Note sturdy construction of machine pictured above.

The McKAY MACHINE Company
YOUNGSTOWN, OHIO

McK

ENGINEERS AND DESIGNERS OF EQUIPMENT FOR THE AUTOMOTIVE, FABRICATING AND STEEL INDUSTRIES

The Iron Age

SALUTES

Richard F. Moore **Building machine tools in a 250-man plant, he has shown that a man can gain important business and personal success without getting into massive operations and pretentious ways.**

A visitor to the Moore Special Tool Co. was getting a ride from Richard Moore, company president. Coming out of the plant, the man saw a Cadillac, a Buick and a Chevrolet. He boarded the Cadillac.

He may still be sitting there. Because Dick Moore drives a Chevy.

Dick skips the fancy trimmings. He operates a precision tool and die shop; builds Moore jig borers and jig grinders. Employing less than 250 men in a quiet Bridgeport setting, he has made a name for himself and his products with machine tool men everywhere. He is the only man to serve two terms as head of the National Tool and Die Manufacturers Assn. Two technical books he sponsored are required reading in many engineering colleges. He is proof that important success can be achieved without massive size and pompous ways.

Twenty-five years ago the Moore company was a two-man tool and die shop. It grew as a shop until one day in 1933 Dick wanted a small, accurate jig borer for hole-boring of dies, jigs and fixtures. Available units didn't meet requirements so the company built its own jig borer with accurate, fast-setting lead screws. The new model proved such a success in complex tool operations it was put on the market in 1935. Today some 1600 Moore jig borers are in use.

In 1940 Dick developed a new toolroom machine to finish-grind holes. Called the jig grinder, it helped put toolmaking on an interchangeable parts-and-assembly basis. There are over 600 of these units in use today. Two new machines are due out this year.

Moore operations retain small-shop simplicity but there is nothing backward about the company or its head. The two 400-word books Dick has sponsored are authoritative works on hole-location practice. One sold 10,000 copies; the second may top that figure.

Dick spends free time gardening and tending chickens. One son, Wayne, was a crack Yale swimmer, competing in the Olympics.

IN ANSWER TO THE GROWING DEMAND FOR
SANDVIK QUALITY STEELS—
NEW
SANDVIK PLANT
Main Office
Eastern Warehouse
Modern Rolling and Slitting Facilities
At 1702 Nevins Road, Fair Lawn, New Jersey
Telephones: Fair Lawn 4-6200 • In New York City: WAtkins 9-7180
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TO BENEFIT USERS OF ALL SANDVIK PRODUCTS

The new Sandvik building provides modern, expanded facilities for the *administrative, production* and *Eastern Warehouse* operations of the main company and all divisions, including:

SANDVIK-COROMANT

Carbide Tipped Tools, Blanks and Inserts. Milling and Combination Cutters.

SANDSTEEL SPRING

Power springs for watches, instruments, office machines and other industrial uses.

SANDVIK STEEL BELT CONVEYORS

Cold rolled Carbon and Stainless Steel Belt Conveyors for Material Handling and Processing.

SANDVIK SAW & TOOL

High Quality Swedish Hardware, Tools and Specialties.

Works: Sandviken, Sweden • Hellefors, Sweden

Sandvik Quality Steels

SS-107

For applications which require HIGH FATIGUE LIFE, FINE SURFACE FINISH, ACCURATE & UNIFORM GAUGE specify SANDVIK cold rolled specialty strip steels.

You can get Sandvik strip steels:

- **In special analyses for specific applications.**
- **Precision-rolled in thicknesses to fit your requirements.**
- **In straight carbon and alloy grades.**
- **Annealed, unannealed or hardened and tempered.**
- **Polished bright, yellow or blue.**
- **With square, round or dressed edges.**
- **Wide range of sizes in stock—**
  —or slit to your specifications

Ask your nearest Sandvik office for further information or technical assistance.

Sandvik Swedish Specialty Strip Steels are used for Textile Machine Parts such as sinkers, needles, etc. • Band Saws (metal, wood and butcher) • Camera Shutters • Clock and Watch Springs • Compressor Valves • Doctor Blades • Feeler Gauges • Knives such as cigarette knives, surgical, etc. • Razor Blades • Shock Absorbers • A Wide Variety of Springs • Trowels • Reeds: Vibrator, Textile, etc. • Piston Ring Segment and Expanders • and many other applications.

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SANDVIK CANADIAN LTD., P.O. Drawer 430, Station O, Montreal 9, P.Q.

The Iron Age INTRODUCES

William P. Drake, elected president, **Pennsylvania Salt Manufacturing Co.,** Philadelphia.

Frank W. Rickard, elected president and general manager—Mechanics Universal Joint Div., **Borg-Warner Corp.,** Chicago. **Harold Nutt,** elected president and general manager—Borg & Beck Div. **Clyde Bissell,** elected vice-president, and **Edward H. Lipke,** also elected vice-president.

D. R. Tashjian, named manager on engineering—electronics div., **Westinghouse Electric Corp. F. S. Mabry,** named engineering consultant to the division manager. **D. P. Hugo,** named portable appliance district manager for Knoxville, Nashville and Chattanooga area, **J. H. Compton,** elected vice president of the **Westinghouse Electric Co. of Europe.**

Otto W. Franke, appointed manager—Central Production Engineering Dept., **Chrysler Corp.,** Detroit. **A. C. Breitenbeck,** appointed manager—Detroit office, West Coast Div. and **Milton B. Porter** named director of forward planning. **Roy A. McAda** and **George W. Warner,** named assistant sales managers, MoPar Parts Div.

Charles J. Cannon, named manager, Federal Contracts Sales Div., **Vickers Inc.,** Detroit.

Donald E. Moat, appointed assistant director — marketing, **Leeds & Northrup Co.,** Philadelphia.

Charles W. Mote, named plant manager, **Dodge Forge Plant,** Detroit.

James A. McNamara, appointed comptroller, Delco Products Div., **General Motors,** Dayton, Ohio. **Robert G. Middlesworth,** named resident comptroller, Kansas City, Kansas plant, Buick-Oldsmobile-Pontiac Assembly Div.

Robert H. Campe, appointed assistant manager, industrial glass sales, **Pittsburgh Plate Glass Co.,** Pittsburgh.

Gordon T. Graham, named manager of marketing—Small Integral Motor Dept., **General Electric Co.,** Fort Wayne, Ind.

D. L. McLellan, appointed administrative manager, parts and service department, Nash Motors Div., **American Motors Corp.,** Detroit. **John S. Krider,** named parts and service promotion manager; **John R. Leonard,** assistant parts and service manager — eastern half of U. S.; and **J. F. Buck,** named assistant parts and service manager—western half of U. S.

John P. Cochran has joined the **Columbia Iron and Metals Co.,** Cleveland.

John W. Swengel, appointed assistant works manager, R-P&C Div., **American Chain & Cable Co.,** Reading, Pa.

Harry E. Heseltine, Jr., appointed Chicago district sales manager, **Penn Metal Co., Inc.**

CHARLES B. GRACE, elected president, Heintz Manufacturing Company.

SAMUEL M. FELTON, appointed president, American Car and Foundry Div., ACF Industries, Inc.

HARRY J. LEDDY, appointed president, Shippers' Car Line Corp., a subsidiary of ACF Industries, Inc.

CHARLES B. LANSING, JR., elected president and treasurer, Ferry Cap & Set Screw Co., Cleveland.

LIFE STEPS UP AT 40!

1915 – 1955
FORTY DE-STA-CO YEARS
QUALITY STAMPINGS

Sure we've been making stampings for 40 years! . . . But we're going up the hill faster than ever!

Expanded facilities! . . . Newer equipment! . . . Wider diversification! . . . Even more customers—and from every major industry!

The mere fact that we're the nation's best-known job stamping manufacturer . . . shows how we've progressed.

Now . . . as our life steps up at 40 . . . would be a good time to let us do a bang-up job for you, too!

DETROIT STAMPING COMPANY
DE-STA-CO
345 Midland Ave., Detroit 3, Mich.
America's Best-Known Job Stamping Manufacturer

Edward W. Cooper, named eastern sales manager, Special Products Div., **U. S. Pipe and Foundry Co.,** Burlington, N. J.

Frank B. Stauffer, appointed West Coast representative, **Ohio Steel Foundry Co.,** Oakland, Calif.

Thomas A. Foss, named assistant superintendent, rail accessories div., **Inland Steel Co.**

Vernor L. Barbor, Jr., appointed eastern sales representative, **Ohio Ferro-Alloys Corp.,** Canton, O.

C. D. Hudson, appointed acting supervisor, of internal audits, **Crucible Steel Co. of America,** Pittsburgh.

Richard J. Swan, appointed director of sales, Magnetic and Electronic Materials, Sales Div., **Allegheny Ludlum Steel Corp.,** Pittsburgh. **Milton M. Fenner, Jr.,** appointed director of sales, Tool and Die Steels.

Townsend Wheeler, appointed central New York regional sales representative, **Russell, Burdsall & Ward Bolt and Nut Co.,** Port Chester, N. Y.

Edwin C. Ahrendt, appointed roll shop superintendent, Warren district steel plant, **Republic Steel Corp. James G. Cloyd,** appointed district industrial engineer for the Chicago district.

Dr. Samuel Zerfoss, a physical chemist, has joined the Mineral Products Div., **National Bureau of Standards.**

Eugene F. Shaw, appointed assistant sales manager, Dodge Div., **Chrysler Corp.,** Detroit.

Joseph Oros and **Elwood P. Engel,** appointed special staff stylists, **Ford Motor Co.,** Dearborn.

Charles J. Tuckley, director of sales, **Guibert Steel Co.,** Pittsburgh.

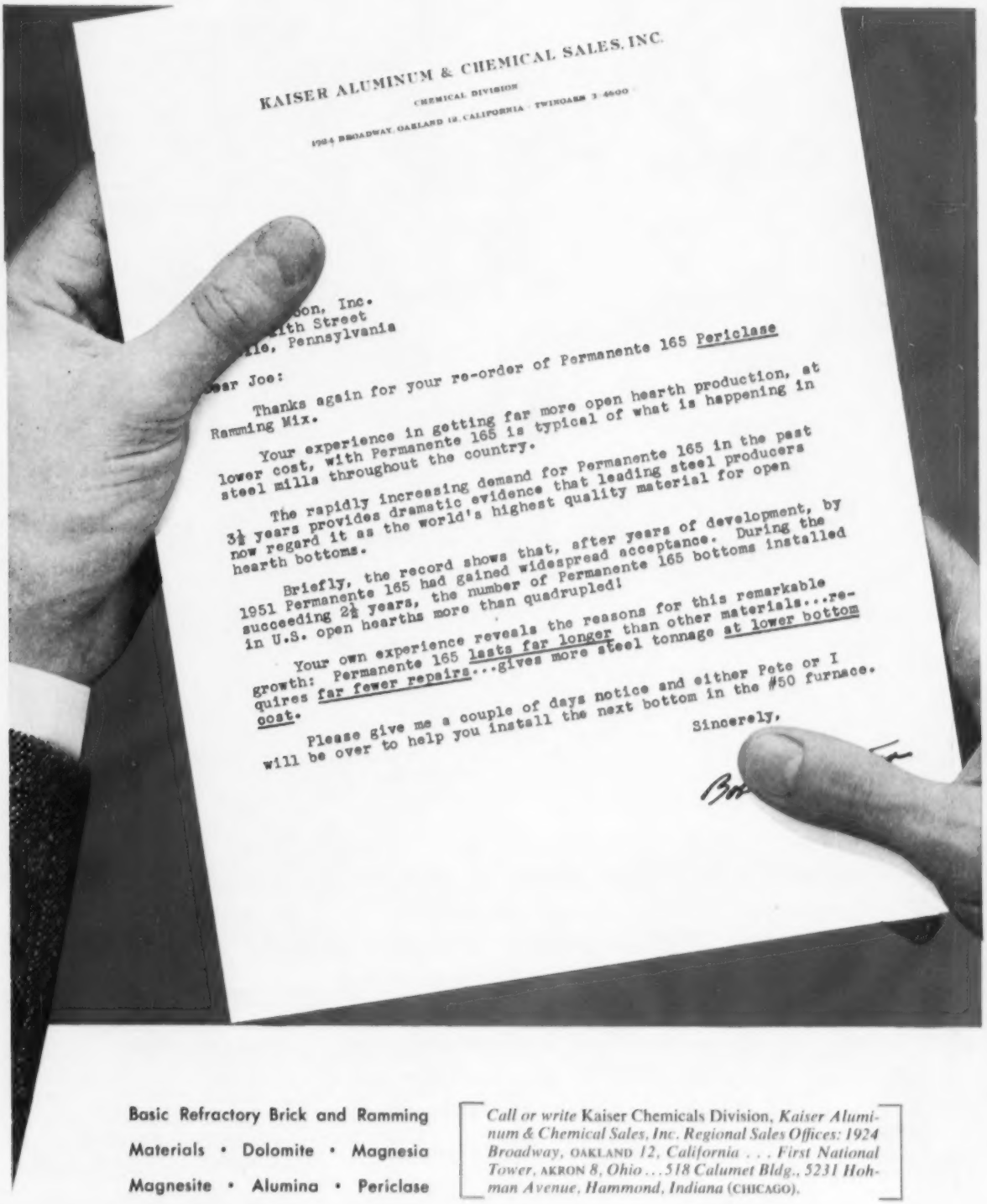
D. A. Schriver, elected secretary, **Vanadium Corp. of America.**

W. H. NORTH, elected vice president and secretary, Ferry Cap & Set Screw Co., Cleveland.

PAUL W. NORRIS, elected vice president and director of sales, Denison Engineering Co.

CHARLES TAMBURELLO, appointed eastern district sales manager, Helical Tube Corp., Grand Rapids, Mich.

RALPH W. MOWRY, named manager of western sheet sales, Youngstown Sheet and Tube Co.


KAISER ALUMINUM & CHEMICAL SALES, INC.
CHEMICAL DIVISION
1924 BROADWAY, OAKLAND 12, CALIFORNIA · TWINOAKS 3-4600
oon, Inc.
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ear Joe:
Thanks again for your re-order of Permanente 165 Periclase
Ramming Mix.
Your experience in getting far more open hearth production, at
lower cost, with Permanente 165 is typical of what is happening in
steel mills throughout the country.
The rapidly increasing demand for Permanente 165 in the past
3½ years provides dramatic evidence that leading steel producers
now regard it as the world's highest quality material for open
hearth bottoms.
Briefly, the record shows that, after years of development, by
1951 Permanente 165 had gained widespread acceptance. During the
succeeding 2½ years, the number of Permanente 165 bottoms installed
in U.S. open hearths more than quadrupled!
Your own experience reveals the reasons for this remarkable
growth: Permanente 165 lasts far longer than other materials...re-
quires far fewer repairs...gives more steel tonnage at lower bottom
cost.
Please give me a couple of days notice and either Pete or I
will be over to help you install the next bottom in the #50 furnace.
Sincerely,

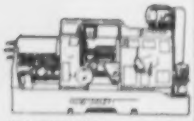
Basic Refractory Brick and Ramming Materials • Dolomite • Magnesia Magnesite • Alumina • Periclase

Call or write Kaiser Chemicals Division, *Kaiser Aluminum & Chemical Sales, Inc. Regional Sales Offices: 1924 Broadway,* OAKLAND *12, California . . . First National Tower,* AKRON *8, Ohio . . . 518 Calumet Bldg., 5231 Hohman Avenue, Hammond, Indiana* (CHICAGO).

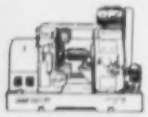
Kaiser Chemicals

Pioneers in Modern Basic Refractories

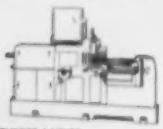
THERE'S SAFETY IN NUMBERS



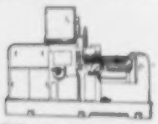
BAR AUTOMATICS
4 Spindle — 7 sizes, 1 to 7⅛"
6 Spindle — 9 sizes, ⅝ to 6"
8 Spindle — 6 sizes, ½ to 4"



CHUCKING AUTOMATICS
4 Spindle — 2 sizes, 10 and 12"
6 Spindle — 4 sizes, 3¼ to 12"
8 Spindle — 2 sizes, 6 and 8"



TURRET LATHES
(Bar-Type — Fully Automatic)
Single Spindle — 3 sizes, 3½ to 8½



TURRET LATHES
(Chuck-Type — Fully Automatic)
Single Spindle — to 12" cap.

CHUCKING AUTOMATIC
Single Spindle ("Chuckmatic")
To 12" capacity

Performing intricate and complex machining operations in seconds where, only a few years ago, minutes—even hours—were required, today's automatic screw machines are marvels of production.

In the final analysis, however, the ability to get *all* the production these machines are designed to deliver depends upon operator experience.

And of equal if not greater importance is the background of tooling experience the machine builder can deliver.

With more Acme-Gridleys in use over the years than any competitive machine, it's a safe bet you'll also find more men trained in the operation of Acme-Gridleys than in any other "automatic."

There is safety (for you) in numbers. All this operator experience, plus the tooling experience gained in more than sixty years by National Acme (more than 300,000 tooling case histories) is available to strengthen your competitive position.

Why not put this experience to work in your shop?

THE NATIONAL ACME COMPANY
175 East 131st Street, Cleveland 8, Ohio

OUR JOB: TO PROVIDE THE RIGHT MACHINE FOR YOUR JOB!

See us at the Machine Tool Show Sept. 6 through 17. Booths 324 and 705

PERSONNEL

L. K. Shepard, appointed sales manager-machine tool division; **Harvey L. Spaunburg, Jr.,** sales manager of the general contract division, and **Arnold T. Suhart,** appointed sales manager of the machine tool accessory division, **Hartford Special Machinery Co.**

H. W. Bluethe, appointed assistant advertising manager, Industrial Div., **Surface Combustion Corp.,** Toledo, Ohio.

James R. Pumphrey, appointed administrative assistant-general sales manager, Brainard Steel Div., **Sharon Steel Corp.**

Robert S. Sherwood, appointed assistant director - research, **Worthington Corp.**

M. D. Bellware, named a member of the welding group, technical service section, Development and Research Div., **International Nickel Co., Inc.**

D. E. Hutchinson, appointed assistant-manager of sales, Boston office, National Tube Div., **U. S. Steel Corp.**

Louis J. Lamit, appointed supervisor of cost estimating, Chrysler Div., **Chrysler Corp.,** Detroit.

Thomas H. Beggin, appointed to the Cleveland office, Wheelco Instruments Div., **Barber-Colman Co.**

David C. Clem, appointed mill representative, **Seymour Manufacturing Co.,** Conn.

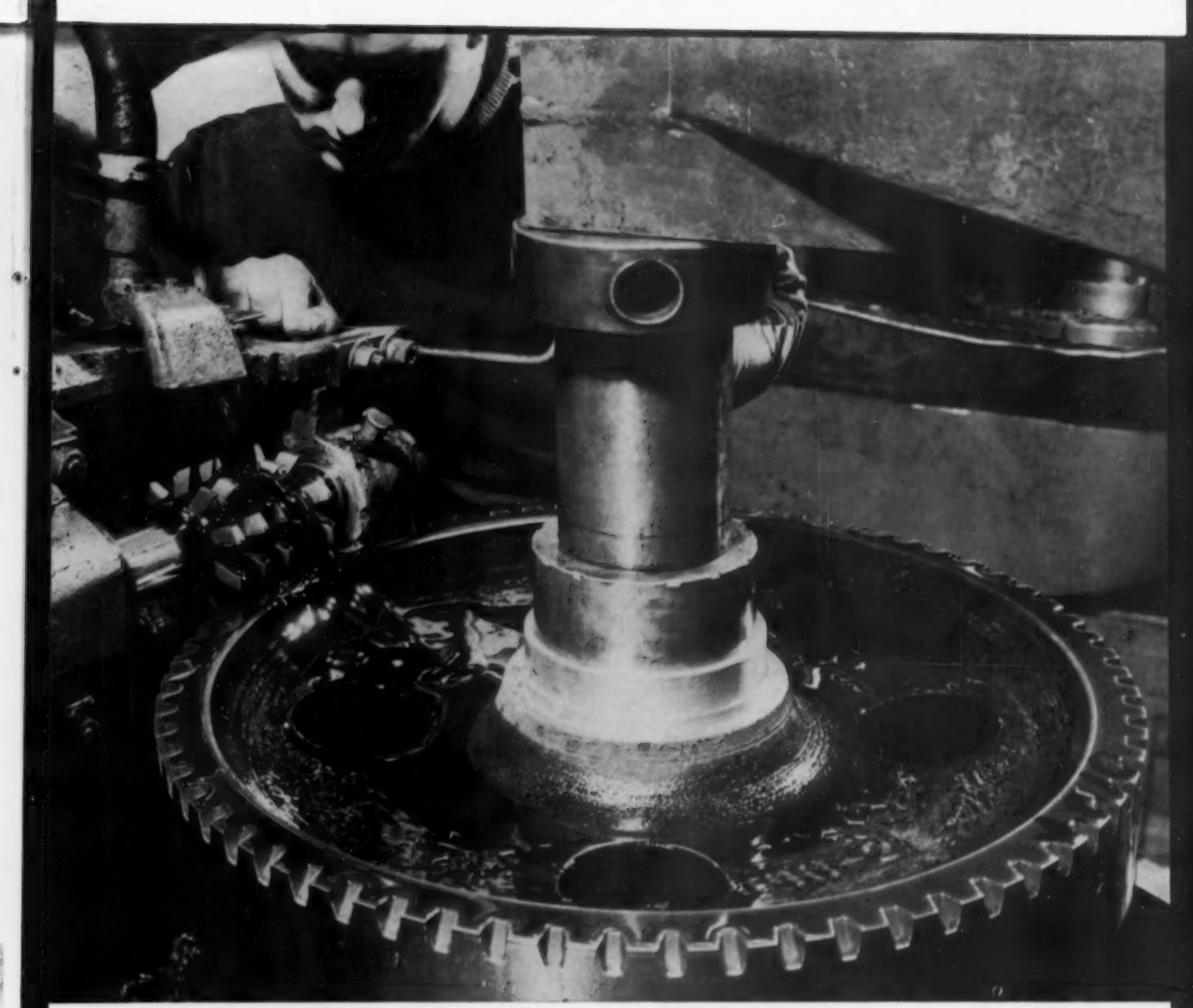
OBITUARIES

Quincy Bent, retired vice-president, **Bethlehem Steel Company.**

E. W. Hall, purchasing agent, **Aluminum Goods Mfg. Co.**

Carl F. Mayer, Sr., president and founder of the **Carl Mayer Corp.,** Cleveland, Ohio.

Edgar D. Rogers, 93, retired sales manager for the **Cambria Steel Corp.,** Johnstown, Pa.



Pittsburgh Gear switched to SSW forged blanks... saved 50 minutes machining time, extended cutter life 20%

Switching to SSW forged steel gear blanks in manufacturing mine locomotive drive gears has given Pittsburgh Gear Company, Neville Island, Pa. . . .

- **savings of 50 minutes in machining time.**
- **better performance through extended service life (cutter life increased 20%).**
- **reduced cutter costs.**
- **over-all lower initial cost.**

These benefits are a result of the more uniform internal structure and close dimensional tolerances of Standard Steel blanks. Machining is done on a single setup, at a maximum speed because there's no danger of hard spots and sand porosity as with castings.

Pittsburgh Gear knows their product must take extra-rugged wear in mining operation. In service the continuous starting and stopping of mine locomotives subjects drive gears to severe shock and impact. The denser core and uniform structure of these SSW blanks contribute to longer-lasting, failure-proof life of these gears.

Like Pittsburgh Gear, you can improve your product and cut your costs with SSW forgings. Write today for the new Standard Steel folder on forged weldless rings and flanges. Use the coupon now.

Standard Steel Works Division

BALDWIN-LIMA-HAMILTON

Dept. 8516, Standard Steel Works Division
Baldwin-Lima-Hamilton Corporation, Burnham, Pa.

Please send me new Standard Steel Works folder containing detailed information on Forged Weldless Rings & Flanges.

Name _____ Title _____

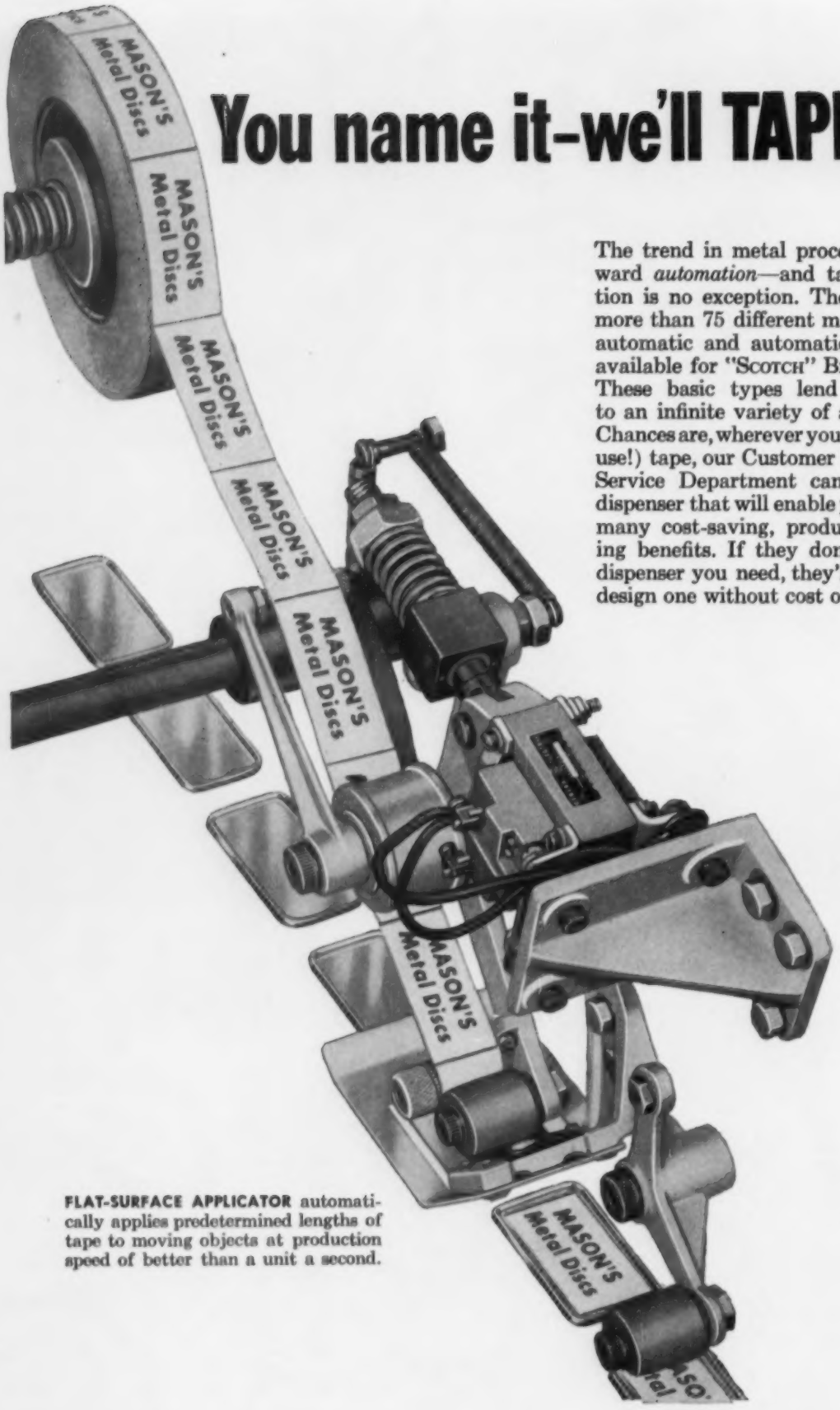
Company _____

Address _____

City _____ Zone _____ State _____

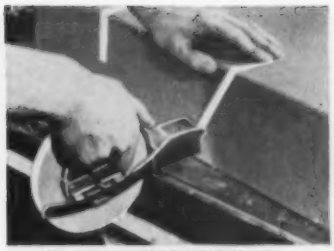
You name it–we'll TAPE it!

The trend in metal processing is toward *automation*—and tape application is no exception. There are now more than 75 different manual, semi-automatic and automatic dispensers available for "SCOTCH" Brand Tapes. These basic types lend themselves to an infinite variety of adaptations. Chances are, wherever you use (or *could* use!) tape, our Customer Engineering Service Department can provide a dispenser that will enable you to enjoy many cost-saving, production-speeding benefits. If they don't have the dispenser you need, they'll be glad to design one without cost or obligation.



FLAT-SURFACE APPLICATOR automatically applies predetermined lengths of tape to moving objects at production speed of better than a unit a second.

. . . Manually

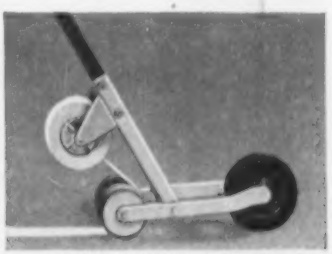


1. HAND APPLICATION of tapes can be made easier with proper dispensers. Above: "SCOTCH" Brand Filament Tape used to seal and reinforce shipping carton is applied from easily loaded dispenser. A flick of the wrist cuts tape to desired length.

2. PACKAGING OPERATIONS can be speeded by specially designed dispensers. Above: "SCOTCH" Brand P-35 Dispenser applies strip of tape around twisted neck of polyethylene bag; leaves tape tab for price; gives quick, clean cut-off with no tape waste.

. . . Semi-Automatically

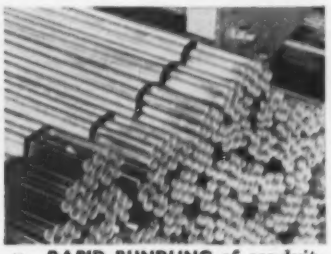
3. EASY WAY TO WRAP a bulky bundle: As automobile bumper is lowered into wrapping cradle, battery of air-operated dispensers deliver predetermined lengths of "SCOTCH" Brand Filament Tape to workers. Fast, efficient wrapping at production line speeds.



4. SPECIAL DISPENSERS solve special problems. Above: "SCOTCH" Brand Lane Marking Applicator applies "SCOTCH" Colored Plastic Tape on floor to mark lanes, indicate storage areas etc. Roller presses tape down firmly for tight, long-lasting bond.

. . . Fully-Automatically

5. APPLICATION of "SCOTCH" Brand Masking Tape to aluminum strips is handled by this applicator custom-designed by our service department. Strips are masked for protection during drilling and boring operations; dispenser does it at production speeds.



6. RAPID BUNDLING of conduit, rigid-wall pipe, and bar stock with the Guide Company Bundler, Model CG. Machine secures bundles at each end with "SCOTCH" Filament Tape; handles three a minute. (Manufactured by Guide Company, Canfield, Ohio.)

DISPENSERS *for* Reg. U.S. Pat. Off. SCOTCH BRAND Pressure-Sensitive Tapes

The term "SCOTCH" is a registered trademark of Minnesota Mining and Manufacturing Co., St. Paul 6, Minn. Export Sales Office: 99 Park Ave., New York 16, N.Y. In Canada: P.O. Box 757, London, Ontario.

ASK YOUR REGULAR DISTRIBUTOR ABOUT "SCOTCH" BRAND DISPENSERS OR MAIL THIS COUPON

MINNESOTA MINING AND MFG. CO.
St. Paul 6, Minn. DR-65

Please send me complete information on the types of dispensers checked:

1___ 2___ 3___ 4___ 5___ 6___

___Would like a survey of my plant to see where automatic tape applying equipment can cut my costs... speed production.

NAME .....

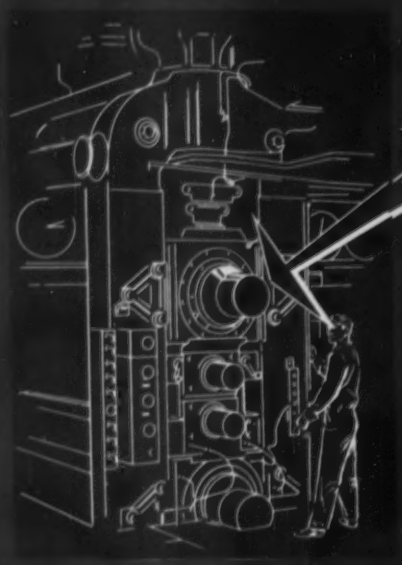
TITLE .....

COMPANY .....

ADDRESS .....

CITY ..... ZONE .... STATE .....

More shaft mileage!



SEALS LONGER, SAVES EXPENSIVE ROLL-NECK RE-GRINDING

Right this minute this seal is saving money in steel mills. Installed on hot mill rolls, C/R's new Type HMS Oil Seals exclude water and foreign matter from expensive bearings, prevent oil leakage and seal dependably with longer service life than ever before. Most important, the Sirvene (synthetic rubber) sealing elements are especially designed and compounded to reduce shaft wear. Tests by users confirm the success of this design. They report little or no shaft scoring with the new Type HMS seals. This means less downtime to re-metalize and re-grind roll necks . . . big savings in maintenance costs.

Your costs can be lowered, too, with the right C/R Oil Seal. Chicago Rawhide's unmatched engineering experience and production facilities are at your service. Please write or phone about your sealing problem. Offices in principal cities.

C/R

PERFECT *Oil Seals*

More automobiles, farm and industrial machines rely on C/R Oil Seals than on any similar sealing device

CHICAGO RAWHIDE MANUFACTURING COMPANY

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IN CANADA: MANUFACTURED AND DISTRIBUTED BY SUPER OIL SEAL MFG. CO., LTD., HAMILTON, ONTARIO

EXPORT SALES: GEON INTERNATIONAL CORP., GREAT NECK, NEW YORK

Other **C/R** *products*

SIRVENE: (Synthetic rubber) diaphragms, boots, gaskets and similar parts for critical operating conditions • CONPOR: Controlled porosity mechanical leather packings and other sealing products • SIRVIS: Mechanical leather boots, gaskets, packings and related products.

The Iron Age
FOUNDED 1855
TECHNICAL ARTICLES

Through stabilization—

How to Improve the Quality of Deep Drawing Steel

◆ Strain aging is a major problem in deep drawing operations . . . It results in "stretcher strains" which mar appearance . . . Some aged materials even tear in the press . . . Nitrogen stabilization in rimmed or capped steels can prevent "stretcher strain" in deep drawing sheet . . . Careful processing of the stabilized material does away with costly tempered rolling and roller leveling.

By E. R. MORGAN, Assistant Manager, and J. C. SHYNE, Research Engineer, Metallurgy Dept., Scientific Laboratory, Ford Motor Company, Dearborn, Mich.

1

FIG 1—Phase diagrams show the equilibrium solubility of carbon and nitrogen in iron decreases with decreasing temperature.

◆ THE AUTOMOTIVE industry, one of the largest users of deep drawing sheet, needs a low-cost material to produce a high finished yield with a minimum of handling.

Roller leveling to obtain surface quality is costly. It requires men and machines to complete an essentially nonproductive operation. These costs can be trimmed by producing a properly processed, rimmed or capped steel, in which the nitrogen has been stabilized. This eliminates aging and, simultaneously, the need for roller leveling.

For automotive uses there is no accurate measure by which to judge the quality of sheet prior to its use on the press. A correlation of properties such as hardness, tensile strength, and percentage elongation is not enough. Even a minimum Olsen cup test value, a common

yardstick of the steelmaker, cannot always guarantee satisfactory deep drawing.

Some of the conditions which affect the quality of deep drawing sheet, particularly where changes in properties occur during storage before pressing, are not always appreciated. A better understanding of these conditions partly depends upon a knowledge of the process operations involved in steel sheet production.

All sheet is rolled from cast ingot. The mold forms and casting techniques used will affect the surface quality of the ingot. Surface defects in the ingot can readily be carried over to the rolled sheet. The steel manufacturer will normally choose a big-end down ingot to produce the highest yield at lowest cost. Many harmful defects can be eliminated by the efficient hot scarfing of these ingots.

The type of steel produced presents another problem. Five main types of steel, graded according to degree of deoxidation, are produced for rolling into deep drawing sheet. By far the most important differences between these grades are the condition of the surface regions of the ingots and susceptibility to aging.

Types of steels

Rimmed, mechanically capped and chemically capped ingots are lower in cost, normally provide an average or better-than-average slab yield, and have good internal cleanliness. They possess a thick surface layer of relatively carbon-free iron produced by the reaction of carbon and oxygen during solidification. This layer of purer material is important in controlling the surface finish of the final product.

Killed steel provides a lower slab yield, an important cost factor to the producer. Semi-killed steel is about average in terms of slab yield but, in common with the killed grade, does not produce the best sheet surface. The problems of segregation and internal soundness are seldom encountered with these grades.

Capped steel generally provides the highest slab yield for the producer. Its excellent surface qualities and high degree of uniformity would make it an equally satisfactory choice for the consumer if the material were not susceptible to aging. The aging tendency overshadows other factors because it results in an increase in hardness, loss of ductility, and deterioration in surface finish.

Killed steel is the one generally available grade that will not tend to age. For this reason the consumer will usually specify a killed grade when material must be stored prior to its use in difficult deep drawing operations. This means a higher purchase cost to the consumer and excessive handling during the sorting and hand finishing necessitated by the poorer surface of the killed steel sheet.

The need for a capped steel not susceptible to aging is dictated by cost factors and the requirements for deep drawing. The principles involved in producing such material must be drawn from our knowledge of aging phenomena.

Quench aging and strain aging are the two phenomena encountered in steel sheet. Quench aging, a form of precipitation hardening, results from the precipitation of carbides and nitrides when steel is stored at room temperature after relatively rapid cooling from elevated temperatures. Precipitation occurs because the equilibrium solubility of carbon and nitrogen in iron decreases with decreasing temperature (Fig. 1).

Quench aging appears to be most pronounced in steels containing about 0.05-0.06 pct carbon. This may be related to the effect of oxygen on the carbon solubility, indicating that precipitation kinetics can be affected by the presence of other elements.

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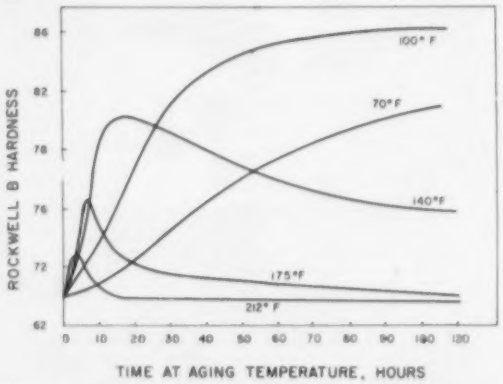

FIG 2—Quench aging of 0.06 pct carbon steel. Shown above are hardness values after quenching from 1325°F and aging at various temperatures.

FIG 3—Quench aging curve for mild steel sheet shows that overaging can restore ductility.

FIG 4—Stress-strain curves show the harmful effect of aging for a 3-week period (B) on annealed and temper rolled steel sheet (A).

FIG 5—A positive edge dislocation showing the region of elastic compression and tension in the crystal lattice (cross section).

FIG 6—In sketches A, B, C, and D the positive edge dislocation moves progressively to the right through the lattice producing slip.

Characteristic of quench aging and precipitation is a change in hardness with time as precipitation proceeds. Fig. 2 shows this change at five different temperature levels.

The time required to attain maximum hardness increases with decreasing temperature. This hardness can be achieved in 8 minutes at 400°F. At room temperature several weeks are required to produce the same condition. There is a corresponding increase in tensile strength and a lowering of ductility as aging proceeds.

Since the effects of quench aging on these properties are reversed in time, ductility can be recovered by overaging. Detrimental changes in mechanical properties due to quench aging can thus be avoided by controlled aging. This is exemplified by the practice of box annealing sheet coils under protective atmosphere and cooling very slowly to room temperature. That slow cooling promotes precipitation and overaging is shown in Fig. 3.

Once the precipitate particles are in the overaged condition, further holding will not harm mechanical properties through quench aging.

Some feel that continuous annealing of sheet coils would be economically preferable to the present batch process. A continuous annealing cycle, to be economical, would involve a rapid cool from the elevated annealing temperature. Rapid cooling would tend to increase the quench aging potential.

To overcome this would require overaging in the range 250°-500°F. Such a treatment might produce optimum ductility, but it would be expensive. Aging below 250°F is not feasible, principally because of the time required.

Strain aging occurs in most cold-worked steel and results in yield point elongation and reduced ductility. Fig. 4 shows a typical stress-strain relationship. This type of aging is most serious because it can destroy the deep drawing properties of a material that was satisfactory originally.

Strain aging arises from the formation of atmospheres of solute atoms around dislocations. A dislocation is a linear lattice imperfection separating a slipped region of the crystal lattice from an unslipped region. Plastic deformation of a metal requires the movement of dislocations through the lattice.

Dislocations are formed during solidification. They multiply during deformation but decrease in number on annealing. Fig. 5 shows how the

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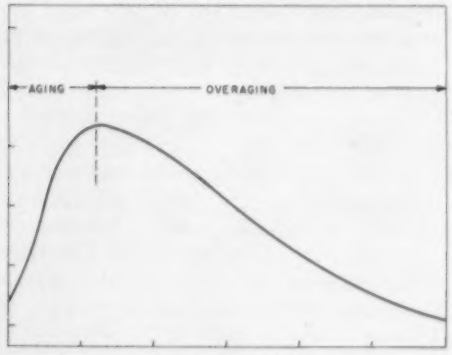

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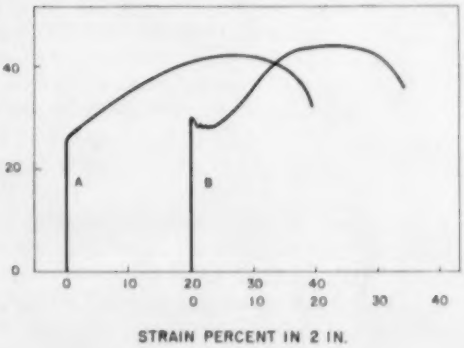

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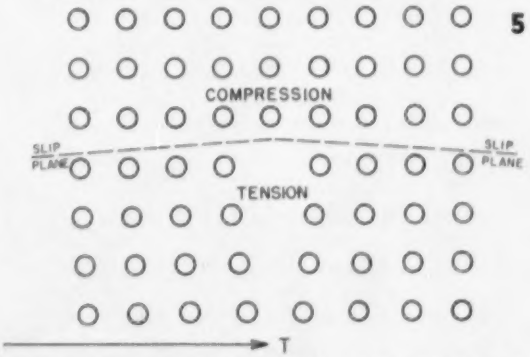

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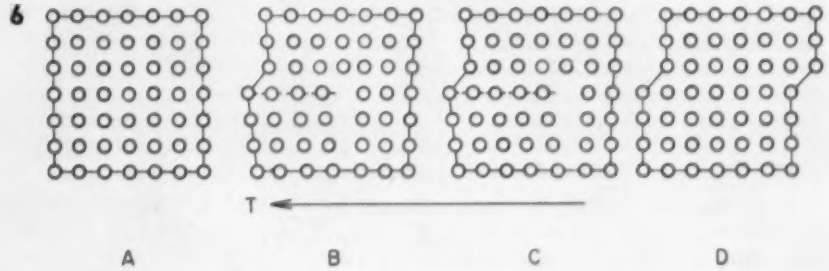


movement of dislocations produces plastic flow. This represents a cross section of a crystal lattice at right angles to the dislocation and slip plane.

The region around a dislocation is subject to elastic strain because the dislocation is a lattice imperfection. For the dislocation shown in Fig. 6, the region above the slip plane is in elastic compression and the region below the slip plane is in elastic tension.

Carbon and nitrogen atoms are known to dissolve interstitially. Both produce elastic strain within the iron lattice. This accounts for their low solubility in iron and why the solubility is so sensitive to temperature.

Carbon and nitrogen atoms prefer to take position where there is more room between the iron atoms. Such positions occur around dislocations, and the formation of atmospheres of these elements give rise to the yield point phenomenon in iron.

Origin of stretcher strains

It takes a higher initial stress to tear a dislocation away from such an atmosphere than it does to continue the movement of the freed dislocation through the lattice. This accounts for the upper and lower yield stress and yield elongation. A completely saturated dislocation atmosphere requires one carbon or nitrogen atom per atomic plane along the dislocation length.

The density of dislocations in annealed iron is about 10^7 per sq cm. With 3×10^7 atoms along 1 cm of dislocation, it should take only 10^{-7} weight per cent carbon or nitrogen to saturate all dislocations and thereby produce a large yield point. This yield point involves a yield elongation and gives rise to surface stretcher strain markings.

Tests show that a yield point cannot be avoided in annealed material containing the usual amounts of carbon and nitrogen. It can be masked by either temper rolling or roller leveling. Temper rolling is normally employed by the sheet producer because it provides a more permanent masking of the yield point.

However temper rolled sheets strain age when they are stored for periods of time. Roller leveling or temper rolling may again be used to mask the yield point, but the resultant loss in ductility is permanent. Such sheets may tear on the press.

Ways to avoid strain aging

It is necessary to examine the mechanism by which strain aging occurs if ways of avoiding this deterioration are to be found. Some plastic deformation of the sheet occurs during the manufacturer's original temper rolling. This deformation multiplies the number of dislocations so that the density of dislocations increases from the original 10^7 to about 10^{11} per sq cm.

Serious yield point effects and loss of ductility will result if all of these dislocations become saturated with atmospheres of carbon or nitrogen. Such saturation requires that sufficient time elapse after temper rolling for the carbon and nitrogen atoms to diffuse to the dislocations.

A dislocation density of 10^{11} per sq cm can be saturated by 0.001 pct of carbon or nitrogen. If the amounts of carbon and nitrogen in solution in box-annealed material are actually 0.0001 and 0.005 pct respectively, then a normal open hearth steel with 0.005 pct dissolved nitrogen will be susceptible to strain aging.

There are four ways to avoid strain aging:

1—Temper rolling before shipping can be omitted. The consumer would then have to temper roll or roller level just before pressing. The net result would be excessive handling and increased cost.

2—Storage period of the temper rolled material can be drastically limited or the material can be stored at low temperatures from the time it is temper rolled. Either method is impractical.

3—Total dissolved carbon plus nitrogen can be reduced to below 0.0005 pct by adding a powerful carbide and nitride forming element such as titanium to the steel. Titanium and other suitable elements are also strong deoxidizers. They will remove enough oxygen from the melt to prevent the rimming action necessary for the production of rimmed or capped steel. This limits such additions to killed steels only.

4—The amount of dissolved nitrogen can be reduced by vacuum degasification or the addition of a nitride forming element that is not a strong deoxidizer. Vacuum degasification is reasonable in theory but will require lengthy development before it can be adopted commercially.

Vanadium is the only element known to form a stable nitride without affecting rimming action. This addition must be present in sufficient amount to tie up all dissolved nitrogen if strain aging is to be avoided. The amount of vanadium required for open hearth steels would be about 1 lb per ingot ton, thereby increasing material costs by approximately $3.00 per ingot ton.

The production of vanadium stabilized steels for deep drawing shows considerable promise. The additional cost involved might be further reduced by the development of a cheaper source of vanadium

The possible substitution of other cheaper elements for vanadium would result in further financial savings to both the steelmaker and the consumer. This presents an important field for future research.

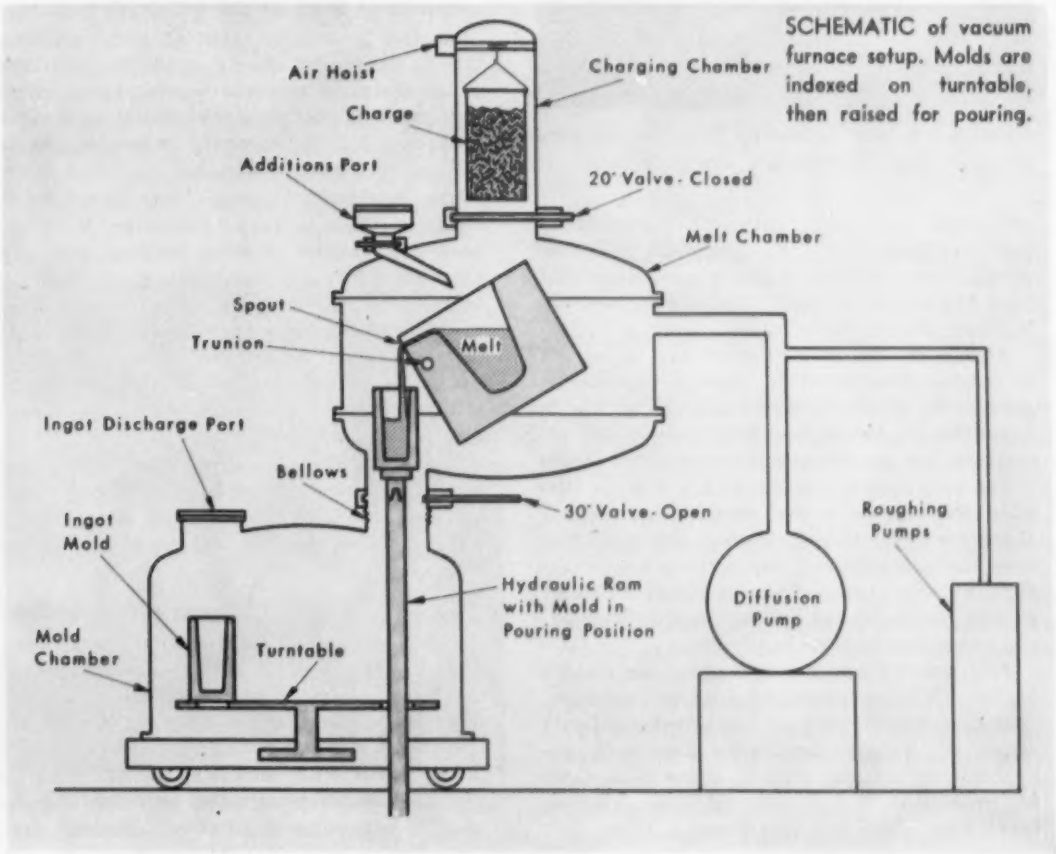
Install Vacuum Setup for Dual Melting Role

◆ Using new, high capacity vacuum equipment with a unique furnace design, Carboloy Dept. is expected to increase GE's production of vacuum-melted alloys substantially . . . Semi-continuous output of gas and oxide-free commercial alloys is slated to reach 120,000 lb monthly . . . Close control of oxygen and nitrogen content and ability to make alloy additions under vacuum conditions will aid the development of new high temperature alloys.

By W. G. PATTON, Asst. Technical Editor

◆ WHOLE FAMILIES OF NEW, highly alloyed metals for elevated temperature applications and forgeable 1000 lb ingots of more familiar heat resisting and standard SAE alloys having exceptional properties will soon be available from the Carboloy Dept. of General Electric Co. at a rate of more than 120,000 lb per month.

The firm's new vacuum-melting installation is considerably more than a grown-up pilot plant. Description of the unit as a semi-continuous 1000 lb vacuum melting furnace fails to convey the significant fact that its new and more powerful vacuum pumps and special furnace design will not only permit comparatively large scale



SCHEMATIC of vacuum furnace setup. Molds are indexed on turntable, then raised for pouring.

CHARGING can is lowered first into charging chamber, later descends into furnace crucible.

production of gas-free and oxide-free metals in 1000 lb ingot form; the new setup will also permit alloy additions under conditions that have heretofore not been attainable in commercial size vacuum installations.

Ability to control oxygen as well as ability to remove other dissolved gases is expected to permit the production of comparatively large quantities of metals free from oxides and inclusions that are common to commercial steels.

The new vacuum melting unit will make possible the production and development of new alloys for gas turbines. High purity steels for bearings, aircraft, and locomotives, and a variety of other compositions designed to resist elevated temperatures will be made in commercial quantities at the Detroit plant.

The production of low cost alloys for turbine blades will also receive considerable attention. And development work on the promising Fe-Al series of high temperature alloys will undoubtedly be a major project. Other likely fields of production include chromium-base alloys, cobalt-base alloys and nickel series alloys.

Carboloy has already produced a number of vacuum-made heats of Cr-Ni-Mo steel with outstanding resistance to fatigue. These steels are also characterized by exceptional transverse properties. Improved transverse properties have been an area of special interest in aircraft.

GE has been investigating vacuum melting since 1946. At that time, a small pilot plant was placed in operation at the Research Laboratory in Schenectady. For several years progress was slow. Batch melts of more than 50 lb were rare prior to 1950. Today, several firms are producing 1000 lb melts and there is serious conversation about 10,000 lb vacuum furnaces.

In addition to ability to make alloys that were heretofore not attainable, vacuum melting offers a number of other advantages. For axample, Co-base alloys can be made with minimum loss due to oxidation during melting. Greater cleanliness of the metal results in improved fatigue and stress rupture properties. High chromium alloys, often too brittle for use, can be made usable for many high temperature applications.

Aids wire conductivity

Reduction in gas content may also permit superior drawing of high purity Cu and Ni for electronic applications. Electrical conductivity of Cu wire is improved by vacuum melting. And vacuum-melted iron has shown as much as 60 to 70 pct improvement in resistance to rupture, GE engineers say. Elongation of Fe has been increased as much as 400 pct.

Another promising result of vacuum melting that is apparently closely related to cleanliness of the metal is improved bearing steels. Bearings made of vacuum-melted 52100 have shown up to four-fold improvement in service life, according to company officials.

The new 1000 lb furnace was built by Consolidated Vacuum Corp., Rochester, N. Y. By providing various chamber bottoms with suitable accessory equipment, single ingots, multiple-shaped castings and even centrifugal castings can be made in the same furnace. Semi-continuous operation is possible through interlocks which permit making alloy additions to the melting chamber without breaking the vacuum in the main chamber.

Precise control of melting operations is achieved with a series of 3 control panels. These controls coordinate all functions of power and air evacuating systems with those of the furnace.

Panels guide operator

The first panel balances out the capacitor banks of the 350 kva motor generator set that supplies the power for induction heating. The second panel controls the vacuum system and features a schematic diagram of the vacuum lines tied in with indicating lights. This, as well as suitable port holes, tells the operator what is happening at all times. A third panel

is used to index the turntable on which the ingot mold rests.

Heart of the vacuum furnace system is the series of three powerful pumps that evacuate air from the system. Two of the pumps are the latest design roughing pumps; the third is an oil diffusion pump. The 500 cu ft Kinney pump can hold the furnace operation alone. Addition of a 300 cu ft pump gives additional efficiency and speed of evacuation.

Pumps bring pressure down

Extremely low pressures can be obtained with the 3-stage oil diffusion unit. Roughing pumps will bring pressures down to 500 microns; the oil diffusion pump will take pressures down to one micron.

A coaxial cable arrangement makes it possible to supply power to the tilting furnace unit.

Charging is done in special metal container about the size of a garbage can. Containers are filled with carefully measured amounts of metallic elements. After filling, a container is lifted to the top of the vacuum melting furnace and hooked on the inside top cover. When the cover is replaced, a windlass lowers the charge into the first position. The charging chamber is then evacuated.

Melting takes an hour

After opening a sliding valve to clear a passageway, the charge is lowered into the melting furnace. The hook is disengaged and the valve is again closed off, prior to evacuation of the melting chamber. Once the melt starts, the charging chamber can be readied for the next charge.

Melting range of the furnace is 2800 to 3200°F. Melting normally requires about an hour. Cycling time, including refinement to remove gases and addition of alloys, if any, may require up to 5 hr. Late additions, required either to bring the heat up to capacity or for the purpose of adding new materials, are made through a separate chamber.

OPERATOR on upper floor is handy to controls and vision ports as he tilts furnace to pour.

Additions of Zr, Ti and Al which are highly reactive are made through this chamber. Hydrogen and other gases may also be introduced into the furnace, if desired.

At pouring time, hot metal is poured into ingot molds which are positioned on a turntable. The ingot molds are located inside a large bell-shaped container which is mounted on a platform that runs on tracks.

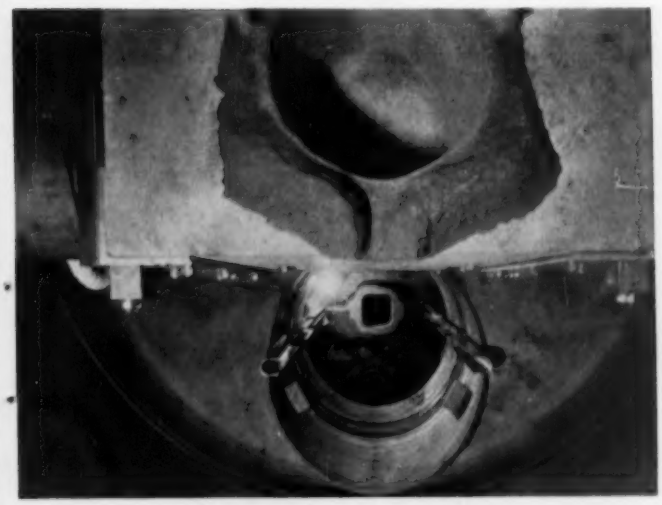
After sealing, the container is evacuated by the roughing pump. A 30 in. valve is opened and a hydraulic lift raises the mold into pouring position. After pouring, the hot ingot is again lowered into the bell-shaped jar.

The furnace shell is made of stainless steel to which tubing has been welded to permit water cooling.

Makes heat resistant alloys

A typical alloy currently being made is Carboloy 1570 which contains 20 pct Cr, 28 pct Ni, 38 pct Co, 7 pct W, 4 pct Ti and 2 pct Fe. Maximum temperature for continuous resistance of alloy 1570 to oxidation is 1800°F. Hardness of the alloy is 26 Rc at 1400°F.

Although it is primarily intended for commercial production of ultra clean and sound ingots and castings, the new vacuum melting installation has the capacity and flexibility to permit a heavy schedule of development work. Presumably, a wide range of both standard and new alloys will be tested for vacuum melting benefits. Any success with small test melts can be capitalized on by a quick switch to volume output in the same furnace.



LOOKING down inside the unit shows how induction furnace will tilt to pour into raised mold.

On diecastings—

Automatic Blast Deflashing Cuts Finishing Costs, Improves Surface Quality

AIRLESS blasting machine for deflashing and deburring zinc and aluminum die castings.

• Savings in finishing costs come to as much as $2000 per month at the Racine Die Casting Co. through the use of airless abrasive blasting . . . The technique replaces conventional manual methods of deflashing and deburring.

• Inspection standards, surface uniformity and appearance of parts have all been greatly improved . . . Porosity and surface defects in diecastings are detected before time and money are spent in further processing.

By E. F. ANDERSON,
Special Engineer,
American Wheelabrator & Equipment Corp.,
Mishawaka, Ind.

◆ INCREASED USE of diecastings has caused more attention to be given to eliminating two bothersome problems connected with them.

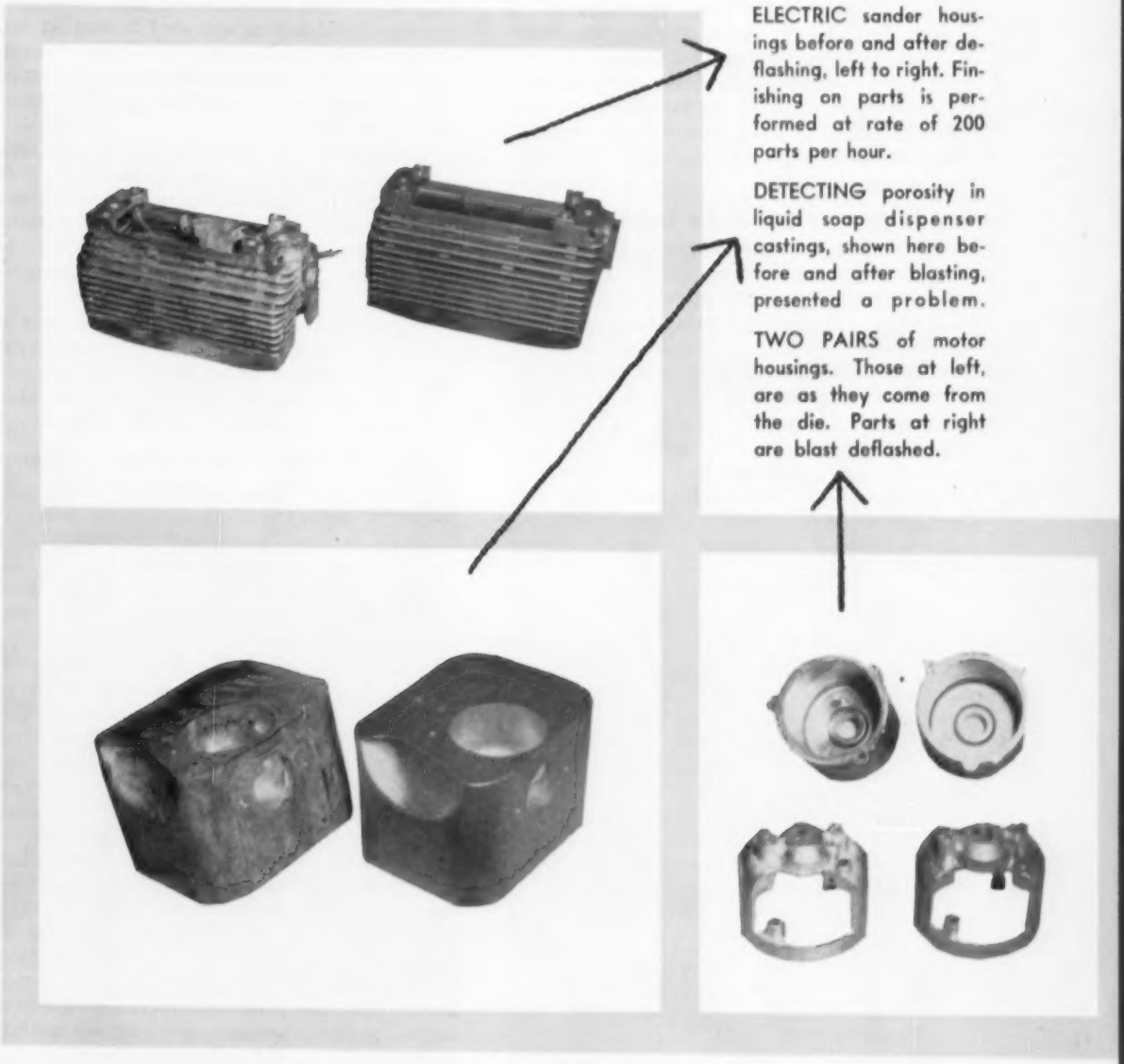
One problem is that of deflashing and deburring thoroughly without spending a lot of money to do it, even though they are complex parts. The other is detecting porosity and surface defects in the diecastings before time and money are wasted in further processing.

Both of these problems were overcome at the Racine Die Casting Co., Racine, Wis. This company is a typical job shop producing a wide variety of zinc and aluminum diecastings. Formerly, the plant employed conventional manual methods of deflashing and deburring. Punch presses, scraping, and filing were used.

As production increased, these methods were found to be too slow. The cleaning room started to become the plant bottleneck. Since a large share of the company's products are housings for various kinds of moving machinery, deflashing and deburring have to be performed very thoroughly.

Another problem confronted the management. Practically all of the firm's diecastings are subsequently painted when they arrive in the customers' hands. A difficulty was encountered here because paint would chip and flake off a considerable number of castings; frequently even before the castings were shipped out of the shop. Occasionally, as much as 25 pct of the castings of a given batch would be rejected after they had been put into an assembly, because paint flaked off.

The cause of poor adherance was understood; it was due to "laminations" in the surface of the metal, which occasionally form during diecasting. What made the problem difficult was



ELECTRIC sander housings before and after deflashing, left to right. Finishing on parts is performed at rate of 200 parts per hour.

DETECTING porosity in liquid soap dispenser castings, shown here before and after blasting, presented a problem.

TWO PAIRS of motor housings. Those at left, are as they come from the die. Parts at right are blast deflashed.

"Newly-developed abrasive pellets used in this process are made of nonferrous material . . . Overall savings due to automatic blast deflashing total as much as $2000 per month . . ."

that these laminations could not be detected under the naturally mottled color of the parts as they came out of the die.

Also troublesome problem was the detection of porosity in castings for liquid soap dispenser units. The same laminations that cause poor paint adherance cause leakage. All castings to be used for liquids had to be water tested. Needless to say this took a lot of time. Testing rate was about 500 pieces per day.

To solve the deflashing and deburring problem, plant officials investigated various automatic methods. Airless abrasive blasting, used frequently in this work, came to their attention. Tests with this method were performed with their castings in the demonstration laboratory of American Wheelabrator & Equipment Corp., Mishawaka, Ind. Results of the tests showed the process well suited to the company's requirements. Since the castings were of an appropriate shape and strength, a Wheelabrator "Tumblast" machine was installed.

Use gentle tumbiing action

The "Tumblast" machine uses a gentle tumbling action together with blasts of abrasive pellets. These pellets are thrown centrifugally by a rotating bladed wheel in the roof of the machine. The deflashing action is performed by the blast alone. The tumbling is merely to turn parts over in the blast and assure equal cleaning action on all areas of all parts. The newly-developed abrasive pellets used in this process are made of a nonferrous metallic material.

The deflashing compartment has a load capacity of 2 cu ft. Parts are deflashed in the following typical groups: 40 aluminum electric sander housings, size 6 in. long, 3 in. wide and 3 in. high; 150 zinc sewing machine motor housings, sized 3 in. long, 2½ in. wide and 3 in. high; or 350 zinc vibrator motor housings, sized 2 in. in diam by 2 in. in height. Other die castings are also handled in quantities depending upon the design and size of the part in question.

Only 10 minutes' blasting is required for a load of 40 electric sander housings making possible a cleaning production rate of 200 per hour. The total cost of finishing this part was reduced $40.00 per 1000 castings. The former method employed six different punching operations with dies, then manual filing, for deburring at 50 per hour. Trimming with a die at a rate of 125 per hour followed that. Occasionally, a bit of filing is still needed, but it is performed in the inspection department. Two girls from the deflashing department were transferred to other work.

The sewing machine motor housings get only 6 minutes' blast, in groups of 50. Manual scraping was replaced on this part. Twenty minutes of blast is sufficient for each group of 350 vibrator housings. These are of such a difficult shape that it would be impossible to fit a trim die to the inside. The alternative method would be manual scraping. The cost of finishing these has been reduced 1½ to 2¢ per casting, or 20 pct. A 30 pct reduction in finishing cost was achieved on another part, a 3 in. x 3 in. x 3 in. jig saw motor housing.

Remove zinc burrs

The thoroughness of the deburring on these parts is just as important as dollar and cent savings. Because they are used in moving machinery, there can be no residual burrs to come loose and create a physical danger to an ultimate user when assemblies containing these parts are put in operation.

Experience at the plant has shown the blast is strong enough to remove zinc burrs and flash up to 0.005 in. thick and aluminum burrs and flash up to 0.010 in. thick. If any material adheres after the blasting operation, it may be assumed that it is rigidly fixed, and creates no danger.

Burrs and flash remaining on the outside of parts after blasting (because of excess thickness) are removed manually, for appearance's sake. Overall savings due to automatic blast deflashing total as much as $2000 per month.

Improve quality control

Airless blast deflashing also improved quality control by solving troublesome surface problems. Blasting imparts an overall uniform surface except where laminations that cause trouble through faulty paint adherance and liquid leakage are located. These are shown up by "blisters" on the part surfaces. Blasting makes these "blisters" stick out like headlights, so that parts having them can be called out by visual inspection. As a result, the rejection rate due to paint failure has dropped to zero in all classes of castings Racine Die Casting Co. produces.

Savings of 2 to 3¢ per casting have been made with respect to the liquid containers, since blast deflashing has permitted the company to cut the required number of manhours for water testing for leakage. Parts showing "blisters" are culled out visually after blasting; these would be leakers, so they are remelted for recasting. Culling out the blistered parts does not eliminate all the leakers, but it does save about half the manhours formerly spent in water testing, because only those castings without blisters need to be water tested.

Automatic Machines Speed Shaft Output

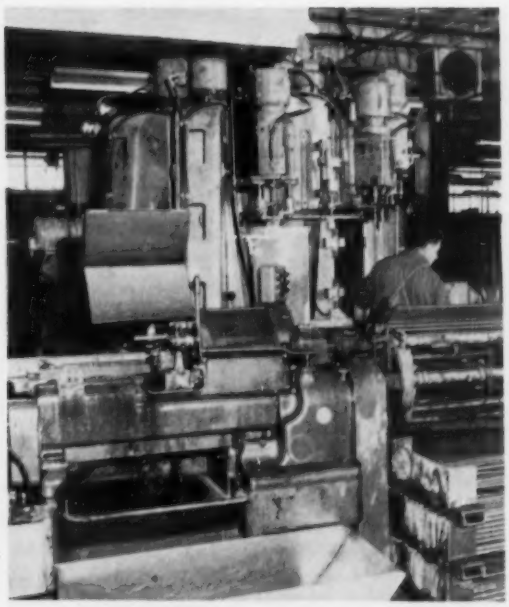
◆ LARGE OUTPUT of automatic clothes washers at the plant of the Whirlpool Corp., St. Joseph, Mich., requires high production of many washer parts. Productive capacity for agitator shafts, for example, must be very high.

Good use of automatics at this plant has made it possible to turn out 1000 washer agitator shafts per 8-hour shift. The agitator shafts are made from SAE 1137 bar stock of ¾-in. diam and measure 25-11/16 in. long. Cutting to length is done with a circular tool in a converted 2G Brown & Sharpe screw machine equipped for magazine feed, the tool being designed to produce radiused ends.

Shafts are then transferred to an adjacent 60-in. Kingsbury Auto-Index machine. This machine has 11 work stations, each with one or more Kingsbury heads. At a twelfth station, shafts are loaded and unloaded in vertical position one at a time and are hand-locked by gates at points where no machining is needed. At subsequent stations, while the dial is locked, a variety of drilling, milling, reaming, and tapping operations are performed.

All Kingsbury heads are designed to advance tools automatically into the work pieces and to retract automatically as soon as cuts are completed, leaving tools clear of the work as indexing takes place. Timing permits 1000 shafts to be completed in an 8-hour shift. One operator can tend both the screw machine and the Kingsbury.

INDEXING MACHINE has twelve stations. Heads are designed to advance tools automatically.



SCREW MACHINE equipped with magazine feed uses circular tool to produce radiused ends.

Long wheel life—

New Contoured Wheel Efficiently Polishes Complex Shapes

• Folded packets of coated abrasives contained in a simply-designed cage make up a new contoured wheel for polishing complex part surfaces . . . Designed mainly for high production setups, the new type wheel provides finer surface finishes, longer wheel wear and permits the use of fewer buffing stations.

• LOWER POLISHING COSTS, finer finishes and longer life are among the advantages listed for a new-type wearable abrasive contoured wheel.

The wheel, highly efficient in the automatic polishing of complex contours, not only can be shaped to the work but will also hold the shape as it wears. Although designed primarily for straight-line and rotary automatic polishing, it is equally adaptable to semi-automatic operations.

The Kon-Toor wheel developed by the Behr-Manning Div. of The Norton Co., offers cost reductions through the elimination of one or more buffing stations, longer wheel life and reduced downtime.

Reduce heat distortion

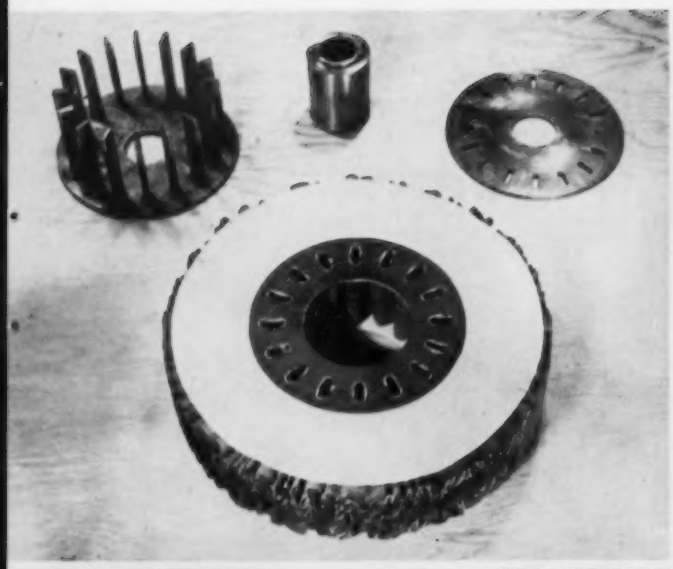
In tests at a midwestern appliance plant 180-grit Kon-Toor wheels 7-in. wide have each worn three to four weeks and applied a first intermediate polish to as many as 350,000 contoured toaster sides. Compared with abrasive belts previously used, production increased 15 pct and abrasives cost dropped nearly 50 pct. Also, the smooth wiping action and the light pressure exerted by the wheel made the work run cooler thus reducing heat distortion.

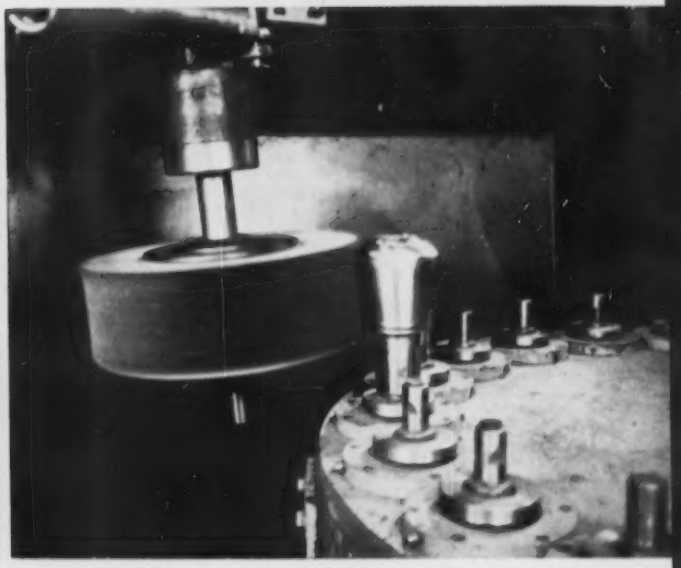
Construction of the wheel is simple. The hub is a steel cage whose side flanges are joined by 16 rods, each supporting an elliptical tube. These tubes hold U-shaped packets of folded, coated abrasive sheets with grain on both sides. Bushings are provided to fit standard drive spindles. Canvas side shields which reduce wind and noise generated by the relatively open construction, complete the assembly.

Wheels are 17-in. in diam, and from 2 to 7 in. in width. For greater widths, wheels may be ganged. Performance is maintained unimpaired throughout the life of the wheel and replacement wheels are available for ready mounting on the original cage or hub. Abrasive cloth used may be Durite silicon carbide or Metalite aluminum oxide.

Recommended wheel speeds range between 1500 and 2400 rpm. Designed for standard spindle mounting, the new wheel can be installed on polishing equipment without change of safety guards, backstands or motor speeds. The Kon-Toor wheel applies almost unbroken abrasive contact to the work. This smooth polishing action is a major reason for the fine finishes which the wheel affords.

To polish sharp angles or complex contours, the face of the wheel is dressed to the contour. Where the contour must be precise, a profile gage is used to transfer the contour of the workpiece to a wooden block; the block, faced with coarse sandpaper, is then used to dress the wheel accurately. Simple, slight contours may be polished without wheel dressing.





Top-Left: **STANDARD Kon-Toor refill wheel with parts which fit it for mounting on drive spindle. At top left is cage with 16 elliptical tubes which engage folded packets of coated abrasives.**

Top-Right: **MASS POLISHING toaster sides on straight line machine. Parts are turned 90° between wheels. Both wheels originally were 17 in. Wheel at left has been in use four weeks.**

Above-Left: **TWO WHEELS are all that are required to cover entire contoured surface of this drawn steel coffee pot. This wheel finishes bottom area.**

Above-Right: **SECOND and wider wheel covers the remaining long taper of drawn coffee pot.**

Right: **FORMING block covered with sandpaper is pressed against wheel to obtain required contour.**

On a laboratory budget—

Modern Rolling Mills Aid Study of High Strength Materials

• Heavier, sturdier laboratory rolling mills, offering greater control and increased flexibility, have been developed to meet modern metallurgical needs . . . Improved mills have been designed to handle many new high hardness, high strength materials.

• While designed with heavier steel housings and improved bearings, and offering greater control of rolling variables, mills have also been built with an eye to the tight laboratory budget . . . Accessories for "packaged" mills permit changes to meet many special conditions with minimum redesign.

By J. I. McMartin, Director of Engineering,
The Fenn Mfg. Co., Newington, Conn.

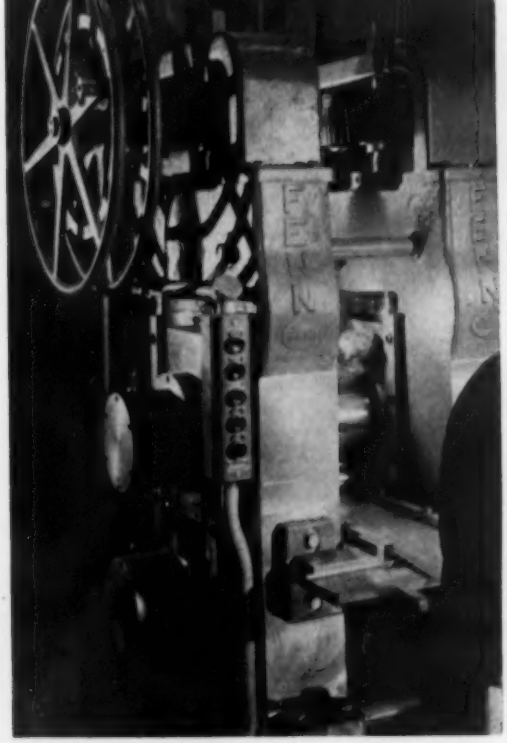
• USE OF ROLLING MILL equipment in metallurgical laboratories has increased sharply since World War II. This increase has been featured by a swing toward heavier, more powerful mills capable of handling the many new high strength materials being studied by metallurgists.

Modern metals are pushing tensile strength and hardness far beyond anything experienced even a few years ago. The working of these metals has required greater and greater allowable separating forces in mills, involving previously unheard of bearing pressures and extremely strong and rigid housings or frames. The development of mills with the strength, sturdiness, rigidity and versatility needed to meet these demands—at a cost consistent with the laboratory budget—has posed engineering and design problems. In meeting these problems, several factors have guided designers of modern laboratory rolling mill equipment.

Many variables—percentage of reduction per pass, speed or rate or rolling, forward or reverse tension while rolling, diameter of work roll, temperature of material—have an important bearing on the quality of the finished product. To obtain reliable and meaningful results it is necessary to vary these factors with absolute control, and to have available sufficient control for them all.

Acceptance of the maxim that "the only way to assimilate a set of conditions is to duplicate them" has brought a demand for test equipment equal to the production equipment on which the tested product will eventually be run. Where such equipment can be obtained, it can later be converted to pilot plant use and subsequently to production use. Practically, it will often be impossible to provide test equipment of such size; in these cases, it will generally be satisfactory to duplicate on a proportionate scale, the reductions, tensions and speeds to be obtained in the production run.

A clearer metallurgic picture can be obtained if control of the specimen is maintained



FOUR-HIGH mill made by Fenn is used in leading steel mill to duplicate production run to scale.

from the ingot down through all of the rolling operations, without the inherent loss of control caused by performing some primary operations outside the laboratory. This factor has also contributed to the demand for heavier equipment.

These requirements have led to several modern design changes. One important change is the wider use of roller bearings of special design. These have replaced commercial antifriction bearings which occupied too much space for the loads they could carry. They have also replaced plain bearings which introduced too much friction under severe loading and were not dependable over large speed ranges. Friction resulting from the use of plain bearings can increase horsepower requirements up to 25 pct and higher under some conditions.

Greater rolling forces possible

Since excessive housing deflection prevented full utilization of the greatly increased bearing capacities, a shift to steel housings has been necessary. This shift to a material as strong in tension as in compression has allowed elimination of "bulges" and other localized increases in section. It has enabled the designer to utilize the relatively inexpensive hot rolled plates now available in greater thicknesses. The result is the ability to use rolling forces from 1½ to 2½ times as great as with materials used in the past.

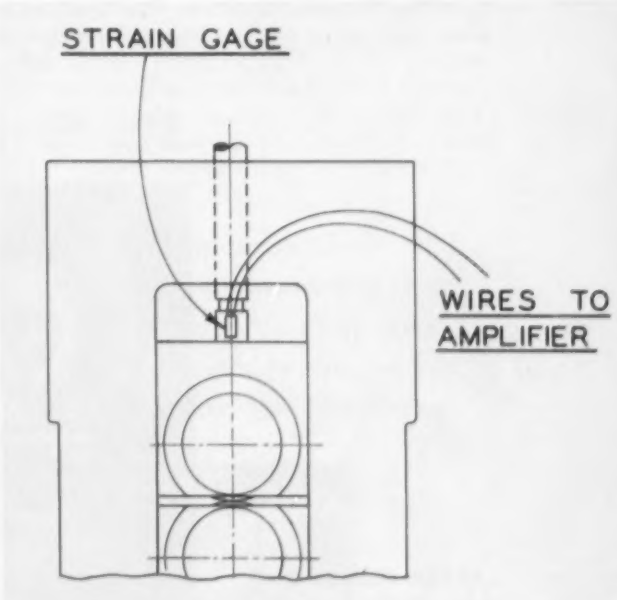
The concurrent development in the motor field of less expensive variable speed drives has helped the mill builder supply optional rolling speeds for his equipment, together with accurately controlled tensions of greater magnitudes.

Accessories give flexibility

Increased flexibility of design permits, without basic cost increases, the special features desired by a specific customer. For example, one leading bearing manufacturer required a mill in which the upper and lower mill rolls be control-heated to a specific surface temperature, and that the upper roll be friction driven in actual rolling, but positively driven when not under rolling load.

The complete design of "packaged laboratory mills" must include a full line of accessories immediately available and easily installed at moderate cost. These include tension takeup reels, variable speed drives, special stock guides, special mechanical and powered screwdowns, lubricating systems, and coolant systems for internal and external use. When these accessories are designed as components of a complete package, they may be installed at a later date with full assurance that they will become integral parts of the basic mill.

Mill instrumentation is needed to give accurate data from which to determine the effects of each variable, separately or collectively, upon the quality of the product. Strain gages with negligible time lag measure instantaneous changes in loading. Direct current ammeters give accurate readings of power consumption



STRAIN GAGES with negligible time lag measure instantaneous changes in loading.

"For laboratory use, with its demands for flexibility, a compromise was in order."

or torque. Tachometer generators indicate speeds and show minute speed fluctuations. High speed recording equipment gives the metallurgist permanent, simultaneous records of all these factors.

For many years the basic two-high mill was the work horse of the laboratory. Capable of hot or cold rolling, strip or grooved rolling at variable or fixed speeds, this type mill found wide acceptance. As newer alloys of higher tensile strengths developed, the bearing pressures, or separating forces, increased. Increased demand for thinner gages further complicated the picture. This led to the use of smaller versions of the production four-high mill, but its limitations had a tendency to cancel out its advantages. The advantages included: (1) By the use of back-up rolls the separating forces could be greatly increased. (2) The smaller arc of contact developed at the smaller work rolls assisted in obtaining thinner gages. The disadvantages were: (1) Large reductions during breakdown were impossible. (2) The maximum torque capable of being transmitted through the work roll journals was limited.

For laboratory use, with its demands for flexibility, a compromise was in order. This resulted in a return to the "combination mill," featuring the backup roll drive, which was manufactured by the Standard Machinery Co. prior to 1925. In this old design only the large back-up rolls could be driven. The small rolls could be inserted for four-high operation, and removed for two-high operation. In the latter case, the back-up rolls became the work rolls.

For four-high operation, only the back-up rolls were driven, and the work rolls depended upon friction between the rolls for their driving force. This had two disadvantages:

1. It was extremely difficult to start the stock between the rolls with either of the two methods employed. In one method, the leading edge of the stock was tapered and the stock was jammed into the roll opening by main force. The other method was to screw down the rolls after insertion of the stock. If the reduction was a heavy one, or if the stock was wide, this could only be done by the use of a heavy-duty power screwdown.

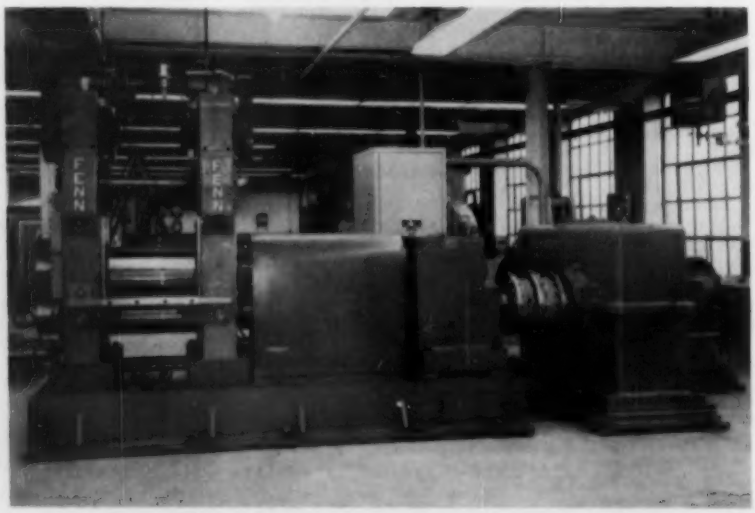
2. Since the separating force generated increases as the square root of the reduction, whereas the torque required to drive the work rolls increases directly as the reduction, it follows that only a range of moderate reductions would satisfy the driving conditions. Therefore, very light or very heavy reductions could not be made, because of insufficient driving friction in either case.

Makes complete range of reductions

On the other hand, there was one important advantage to this rolling method. Since moderate reductions on wide stock exceed the torque capacities of the smaller work roll drive, back-up roll drive was a definite requirement.

The modern combination mill has been designed to overcome the disadvantages and to retain the advantages of its predecessor. It can be operated as (1) a 2-high mill, (2) a 4-high mill with back-up rolls driven, (3) a 4-high mill with work rolls driven.

By varying the drive it is capable of taking a complete range of reductions, from breakdown rolling to the thinnest gage practicable. Used as a 2-high mill, breakdown passes can be taken. Used as a 4-high mill with back-up rolls driven, intermediate passes can be taken on stock of substantial width. Used as a 4-high mill with work rolls driven, light passes on all work and substantial passes on narrow work can be taken.



LARGER MILL can hot reduce 2½ in. square ingot to ½ in. round using optional grooved roll.

From the collection of Lewis Winant, New Jersey Arms Collectors Club. Maker: Wogdon, London, 1786-1787. An 11-by-14 inch print of this illustration will be sent free when requested on company letterhead.

challenge accepted

When this booster rotor, an artillery fuse component, was offered for production to the powder-metallurgy industry, Bound Brook was among those who were quick to accept the challenge. Initially, the part had been produced by machining brass bar stock, a method which proved to be both excessively costly and discouragingly slow. Powder metallurgy fabrication looked simple enough at first, until the critical weight and dimension factors were examined more closely—for in artillery fusing the difference between a hit and a dud can depend on a thousandth of an inch. By mustering all of its know how, accumulated in more than 30 years of producing metal-powder parts, Bound Brook emerged as the major producer of this rotor—at a cost nearly 40% less than was required for conventional machining.

10

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Box, crate hardware

A new 4-page folder which covers their line of standard fibre and plywood box and crate hardware has just been published by Sessions. All items are carried in stock. Sessions will also quote on stampings of your own design or patent. *J. H. Sessions and Son.*

For free copy circle No. 1 on postcard, p. 113.

Automatic index table

The new Power Driven Automatic Index Table, which will be shown at the Cleveland Tapping Machine Co.'s booth at the Machine Tool Show in September, is described and illustrated in a bulletin. This versatile machine is used for drilling, tapping and other sequence operations. *The Cleveland Tapping Machine Co., Subsidiary of The H. P. Townsend Manufacturing Co.*

For free copy circle No. 2 on postcard, p. 113.

Motor switches

The manufacturers and designers of apparatus for the control of electric power for over 60 years have published a catalog on small motor switches. The switches listed are popular types meeting the requirements of manufacturers, electrical contractors, dealers, plant maintenance men and service men. *Cutler-Hammer, Inc.*

For free copy circle No. 3 on postcard, p. 113.

FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 113.

Fork truck

The 6000 lb capacity model 630 sit-down, center control fork truck is described in a bulletin. Features of the heavy-duty fork truck are given in detail. Complete specifications are furnished. Line drawings and a close-up illustration are included. *The Mercury Manufacturing Co.*

For free copy circle No. 4 on postcard, p. 113.

Hydrolairs

Small hydraulic production presses powered solely by compressed air are described in a bulletin. The text includes full dimensional and operational data, tonnage capacities, and specifications on electric and steam-heated hot plates. Among uses listed: plastics and rubber molding, assembly forcing, laminating, and compacting. *American Steel Foundries, Elmes Engineering Div.*

For free copy circle No. 5 on postcard, p. 113.

Fire extinguishing

Pressure operated carbon dioxide fire extinguishing systems are described and illustrated in a brochure. The Kidde rate-of-rise pressure operated system has been designed to be flexible enough to satisfy the requirements of a wide variety of conditions likely to be encountered. It is the newest development in carbon dioxide fire extinguishing apparatus. *Walter Kidde & Co., Inc.*

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Cold drawing equipment

An 8-page product information bulletin on cold drawing equipment includes illustrations and information on dual chain, triple draw, single draw and 5-draw benches; piercing mill, bull block, cold reducing mill; squeeze pointers; air operated carriages and hook; information on drawing speeds, die mountings, length of draws, carriages and tube pushers. *The Aetna-Standard Engineering Co.*

For free copy circle No. 7 on postcard, p. 113.

Bearing sizes

Dimensions and ordering code numbers for more than 1,000 powdered metal commercial bearing sizes are featured in the new 30-page standard bearing sizes booklet. Included are sizes for sleeve, flange, double and single hub spherical type bearings, and for thrust washers. Sections also are devoted to "Selflube" bearing material which is available in solid bar, cored bar and plate form. *Powdered Metals Div., Keystone Carbon Co.*

For free copy circle No. 8 on postcard, p. 113.

Resistance welding

"Resistance welding at work" covers the case history of mash welding double sinks with a 250 KVA mash welder. Within ten days of delivery, one mash welder was installed, put into operation, and with an inexperienced operator joined 10,000 sink units with less than 1% scrap factor for Southern Porcelain. *Sciaky Bros., Inc.*

For free copy circle No. 9 on postcard, p. 113.

Electro-autosizing

A revolutionary electronic development, Electro-autosizing, is described in a brochure. It is the process of automatic and precise control of size during a work cycle by making the size of the workpiece itself control or stop the process. By following the change in size of the workpiece itself, instead of by indirect means such as timing, machine tool setting, etc., it guarantees precision independently of machine characteristics. *Electro-Autosizing Machine Div., Industrial Gauges Corp.*

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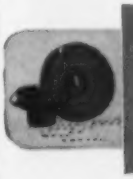

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High strength steels

Just released are two folders on high strength steels. One gives data, including chemical composition, mechanical properties, fabricating practice for cold forming, rolling limits and applications on Republic "50" high strength steel. The second folder contains similar data on "65" and "70" high strength alloy steels. *Republic Steel Corp.*

For free copy circle No. 11 on postcard, p. 113.

Stainless steel valves

Stainless steel valve design, selection, maintenance and repair is covered in a booklet. Printed to form part of the forthcoming catalog, the technical section is being offered separately on request. Photographs, engineering drawings and cut-aways combine to make this a complete, yet condensed, discussion. *Cooper Alloy Corp.*

For free copy circle No. 12 on postcard, p. 113.

Lubrication

"Lubrication and maintenance of ball and roller bearings" is the title of a bulletin. Complete with helpful lists of do's and don'ts to prolong bearing life, it includes information on the storage and handling of lubricants. *New York & New Jersey Lubricant Co.*

For free copy circle No. 13 on postcard, p. 113.

Steel grab

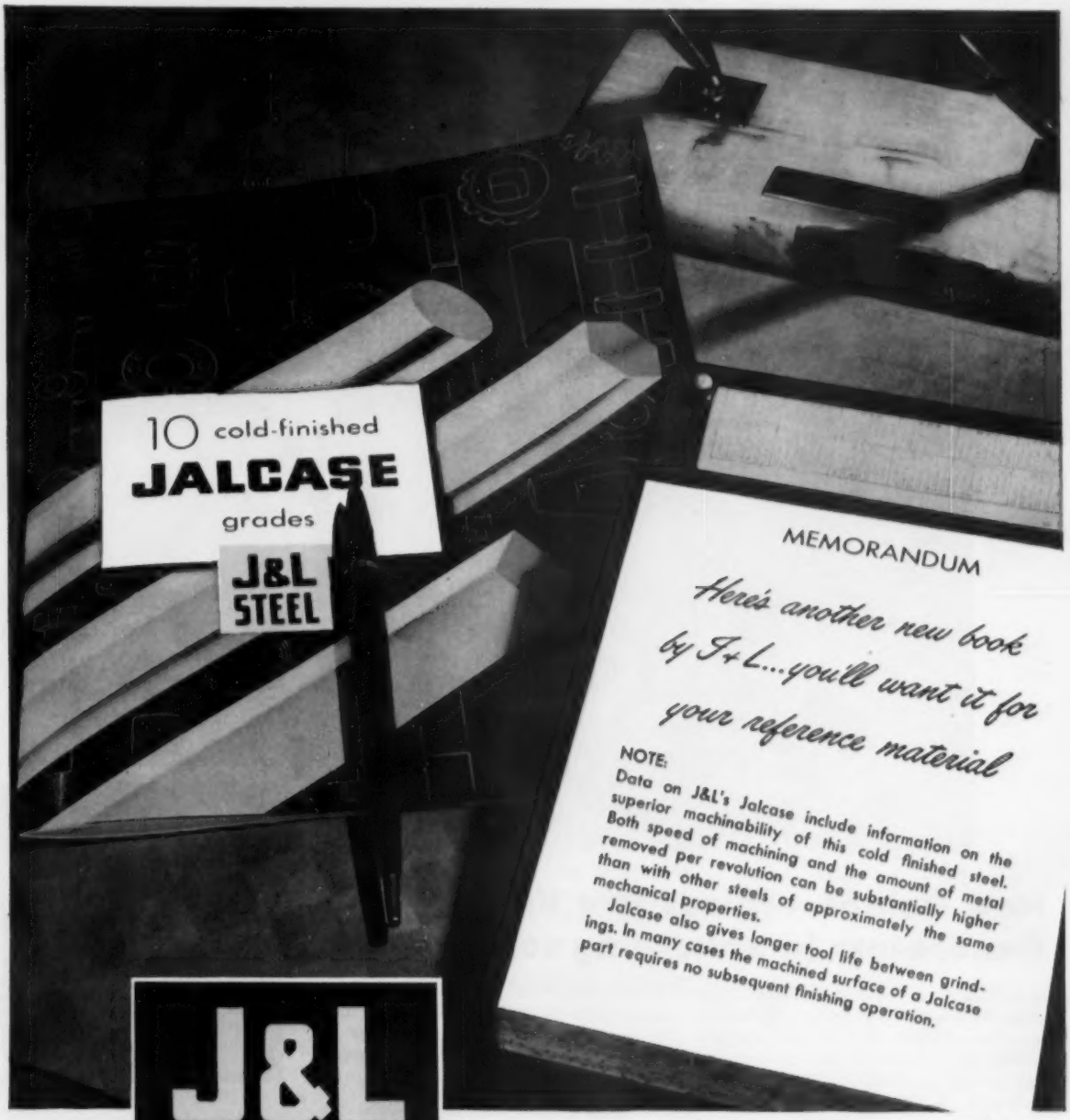
A bulletin on the steel grab, a heavy load grip for either vertical or horizontal pulls of steel plate or structural forms, has been published. It has double-acting jaws which automatically grip both sides of the steel plate when the load is applied. It is designed of corrosion-resistant alloy steel working parts. *Mine Safety Appliances Co.*

For free copy circle No. 14 on postcard, p. 113.

Publication list

Air Reduction Sales Co. has announced the availability of a new publication list. Over 100 welding and cutting technical reprints, text books, safety booklets, slidefilms and movies are described. Order cards, keyed for easy selection, are included for requesting items. *Air Reduction Sales Co., A Div. of Air Reduction Co., Inc.*

For free copy circle No. 15 on postcard, p. 113.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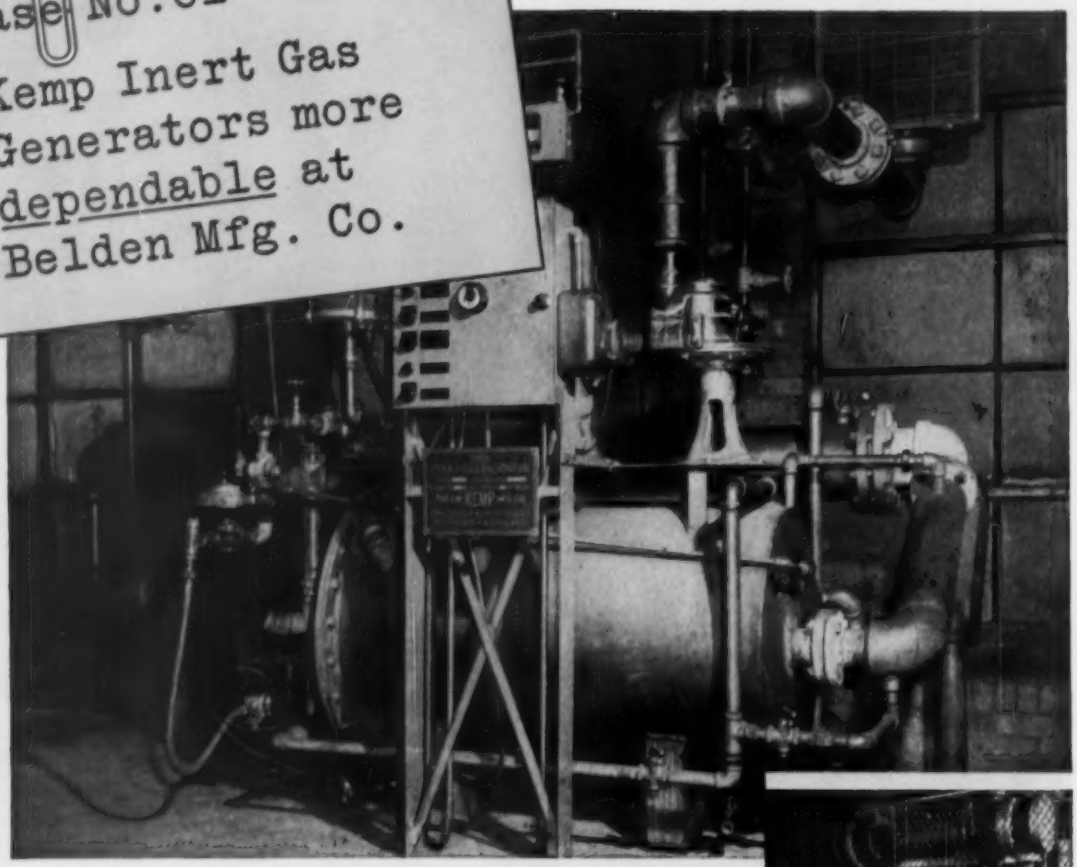
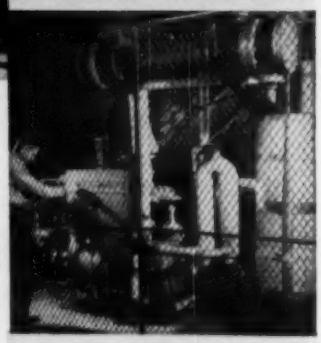
Case No. 61

Kemp Inert Gas Generators more dependable at Belden Mfg. Co.





Generator on first floor of plant is enclosed in wire cage to prevent tampering with controls.

How Belden utilizes two Kemp Generators in annealing copper wire

Annealing copper wire necessitates cooling in an oxygen-free atmosphere to prevent harmful oxidation. For the required protective atmosphere in this process, the Belden Mfg. Co., Chicago, Ill., generates its own inert gas. But the generating equipment formerly used by Belden did not operate reliably . . . results were erratic. So Belden installed two Model MIHE Kemp Inert Gas Generators to handle this important job.

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These two Kemp units assure Belden of a *dependable* inert supply. They deliver a more constant flow at the rated pressure . . . have been operating smoothly and satisfactorily since installation. Kemp's ability to produce a chemically clean inert at a *specific analysis regardless of demand* eliminates the danger of fluctuation at a critical stage.

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For more complete facts and technical information, write for Bulletin I-10 to: THE C. M. KEMP MFG. CO., 405 East Oliver Street, Baltimore 2, Md.

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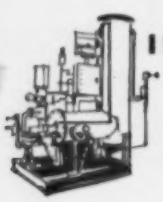

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These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

This section starts on p. 108

Centrifugal pumps

Built to handle high static heads, the pumps described in this interesting bulletin feature single-stage, double-suction centrifugal design. New purge-type grease lubrication is said to lengthen bearing life. Eighteen design features are illustrated on a large cutaway drawing. Tables give specifications and performance data on pumps from 85 to 4,500 GPM, and maximum heads up to 195 feet. *American-Marsh Pumps, Inc.*

For free copy circle No. 16 on postcard, p. 113.

Rebuilt machine tools

A catalog illustrates and describes Miles' rebuilt machine tools, on which prompt, and in many cases immediate, delivery can be made. Machines include: automatics, balancers, boring machines, buffers, drills, furnaces, gear machinery, grinders of all types, lathes, planers, saws, sheet metal and wire machinery, etc. Miles rebuilds and modernizes tools for many of the largest plants in the country. *Miles Machinery Co.*

For free copy circle No. 17 on postcard, p. 113.

Machine components

A 20-page brochure covers the complete line of standardized machine components including hydraulic drill units, automatic cam feed drilling units, lead screw tapping units, multiple spindle heads, automatic index tables and machine bases. It is profusely illustrated with photographs, charts and diagrams, and includes specifications. *Machine Tool Div., The Hartford Special Machinery Co.*

For free copy circle No. 18 on postcard, p. 113.

Drills

A folder on drills that drill steel, iron, wood, plastic, masonite, etc. is available. The drills are useful to maintenance men, machinists, contractors, electricians, and others. Photographs illustrate the many advantages of these versatile drills. *Athol Machine & Foundry Co., Zit Tool Div.*

For free copy circle No. 19 on postcard, p. 113.

Long-stroke diaphragm

A new, loose-leaf, 16-page catalog describes in detail various classes of Bellofram long-stroke, deep convolution, diaphragms. Included are table of standard sizes, available materials, dimensional data tables, and design data. The catalog is illustrated with photos and application drawings. *Bellofram Corp.*

For free copy circle No. 20 on postcard, p. 113.

Grinding wheels

A new "constant diameter" Kodiak grinding tool for all types of grinding operations is described in a 4-page brochure. The tool features adjustable abrasive segments, making it possible to increase or decrease diameter as desired. It is available in a variety of sizes to fit all standard grinding machines. *Continental Products, Inc.*

For free copy circle No. 21 on postcard, p. 113.

Sandblast equipment

The 1955 20-page catalog on sandblasting with Clemco is available. Fourteen different models from 150 lb to 1350 lb sand capacity are described and illustrated. Also shown are the latest in accessory items to fit all existing sandblast units. *Clementina Ltd.*

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Hydraulic scoops

The selection of the right type of scoop attachment can add greatly to the efficiency and versatility of many fork truck operations. Lewis-Shepard has a new circular available which describes hydraulic and mechanical scoops. These scoops are quickly detachable and can be easily interchanged with standard forks. *Lewis-Shepard Products, Inc.*

For free copy circle No. 23 on postcard, p. 113.

Phosphating compounds

The manufacturers of specialized industrial chemical processing compounds have issued a 4-page pamphlet which describes in detail their complete line of phosphating compounds. In addition to a general discussion of phosphating, metal treatment prior to painting and metal treatment prior to other organic finishing, the brochure includes a phosphating reference chart. *Turco Products, Inc.*

For free copy circle No. 24 on postcard, p. 113.

Trolley conveyor

A booklet describes the development of a new improved flangeless A-F 4″ trolley conveyor wheel with a load rating of 600 lbs, as well as the new, lightweight Trol-E-Veyor System. A complete range of engineered overhead trolley conveying systems is now offered by Alvey-Ferguson. The many advantages are described in detail. *The Alvey-Ferguson Co.*

For free copy circle No. 25 on postcard, p. 113.

Easyplater data sheet

A bulletin describes the new industrial Easyplater process. Presented is a summary of the operation of the process, which, because no electricity or anodes are needed, makes it an ideal operation for shops and factories that have no other plating facilities. Featured is a reference chart of the fifteen Easyplater finishes, which include many of the newer alloys together with information on the use, temperature, thickness, equipment needed, etc. *Yorktowne Special Products.*

For free copy circle No. 26 on postcard, p. 113.

FOR MORE LITERATURE
Many companies offer free literature and other information in their advertisements. For the names of these firms see the company listings in the index of advertisers.

Asbestos textiles

A 16-page manual covering asbestos lap, roving, yarn, cloth, tubing, cord, wick, rope and tape has been issued. There is a page or more on each type of asbestos textile. The information includes photographs, drawings and data in tabular form. The manual is of value to: designers; purchasing agents in companies which incorporate asbestos textiles in their products; people who buy or specify for uses where high ambient and operating temperatures prevail, as in iron and steel mills, foundries, glass works, the automotive and aviation industries, etc. *Johns-Manville.*

For free copy circle No. 27 on postcard, p. 113.

Toolplastik

A new Toolplastik brochure covers the use of Phenolics in plastic tooling. This 6-page informative brochure covers applications, properties, characteristics and handling-instructions. Also included is a flow chart demonstrating typical procedure of Toolplastik fabrication and photographs showing industrial applications. *Rezolin, Inc.*

For free copy circle No. 28 on postcard, p. 113.

Transformers

Totally enclosed dry-type transformers with NEMA Group 3 class insulation for indoor or outdoor applications are described. The units are designed for higher temperatures to keep weights and dimensions as low as possible. Advantages claimed for the dry-type transformers include lower initial cost as compared with oil-filled units, more economical operation and increased production through more efficient operation of machines and better lighting. *Allis-Chalmers Manufacturing Co.*

For free copy circle No. 29 on postcard, p. 113.

Contact KAYDON Muskegon

FOR ALL TYPES OF BALL AND ROLLER BEARINGS: 4" BORE TO 120" OUTSIDE DIAMETER

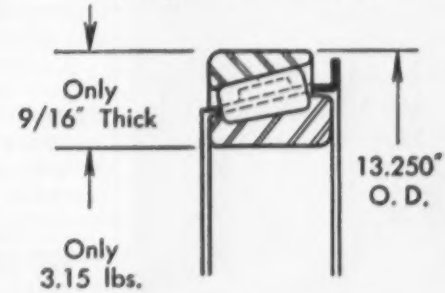
KAYDON single row, tapered roller bearings 12.125" x 13.250" x .718"
Total bearing weight: 3.15 lbs.

KAYDON creates world's THINNEST tapered roller bearings—REALI-SLIM as a wedding ring

Here's another first by **KAYDON** of Muskegon. We now offer the *thinnest* single row, tapered roller bearings ever made. Even a bride's modern wedding ring, made to proportionate size, would not be as thin or light in weight as one of these *Reali-Slim* bearings.

If you're faced with bearing problems, which involve conserving space and weight, consult **KAYDON** while your product design still is on the drawing board. Remember — for standard bearings or bearings of unusual design you can depend on **KAYDON** for the engineering skill and manufacturing facilities to do your job. It pays to contact **KAYDON** first!

Details of thin section, lightweight bearing shown above



Write for engineering catalog!

For complete data on capacity, seals, separators, standard and *Reali-Slim* "wedding ring" bearings, ask for catalog No. 54.

THE KAYDON ENGINEERING CORP.

MUSKEGON • MICHIGAN

KAYDON types of Standard and Special Bearings:
Spherical Roller • Taper Roller • Ball Radial • Ball Thrust
• Roller Radial • Roller Thrust • Bi-Angular Bearings

K-551

PRECISION BALL AND ROLLER BEARINGS

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CORPORATION
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QUANTITY PRODUCTION OF GREY IRON CASTINGS
ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES
ESTABLISHED 1866
THE WHELAND COMPANY
CHATTANOOGA 2, TENN.

PROCESS: More Oil from Coke

Recovery of light oil from coke oven gas has been sharply improved with a more efficient system now in use at Crucible Steel's Midland Works . . . Spray type absorber used in new unit.

A specially designed system for the recovery of light oil from coke oven gas, recently installed at the Midland, Pa., Works of Crucible Steel Co. of America, has increased recovery more than 10 pct using only one of two existing absorption towers.

This report, based on the first month's experience with the system, was released recently by Crucible Steel Co. and The Rust Engineering Co., designers of the new recovery process.

Crucible's previously used absorption facilities consisted of two towers, each approximately 14 ft inside diam x 100 ft high, operating in parallel. Each tower contained six sections packed with steel turnings.

More Efficient Scrubbing

Due to excessive pressure drop, the two towers could not handle all of the gas produced when the coke ovens were in full production. Other factors considered when designing the new process were the low concentration of liquid hydrocarbons in the gas, and the large volume of coke oven gas, averaging 36 million cubic feet per day.

Using only one of the towers and converting it to a spray type absorber, The Rust Engineering Co. designed and engineered a simple, efficient scrubbing system uniquely suited to the recovery of light oil.

Greater Recovery Obtained

The desired intensity of contact is obtained in the new system by circulating the oil at a high velocity with pumps. The savings in horsepower required to carry the coke oven gas through the modified absorption tower compensates for the horsepower required to operate the oil circulation system. A simple, highly effective mist separation section prevents carry-over of liquid wash oil in the gas.

In addition to obtaining greater recovery with one spray tower than with the two packed towers, greater efficiency has resulted.

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 113. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

STAMPINGS
for the FINISHED PRODUCT

SEE SESSIONS . . . for Metal Specialties, Box & Case Hardware, Stamped Assemblies in a wide range of finishes.
J. M. SESSIONS & SON
290 RIVERSIDE AVENUE • BRISTOL, CONN.

Testing:

Peel test shows strength of metal bond adhesives.

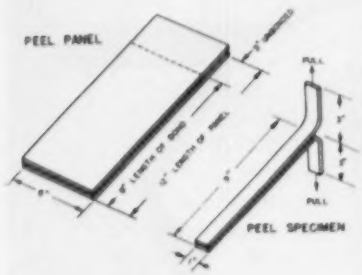
A new peel test on metal bonding adhesives is being used by Douglas Aircraft Co., Santa Monica, Calif. The new test is performed on a 5000-lb capacity autographic recording laboratory Universal testing machine, made by Baldwin - Lima - Hamilton Corp., Philadelphia.

Adhesives to be tested are bonded to 0.032 gage clad 24ST3 aluminum alloy in 6 x 12-in. panels. These panels are bonded in a 6 x 9-in. area, leaving 3-in. long unbonded portions at one end. The panels are then sheared in 1-in. widths and the unbonded ends bent by hand in opposite directions perpendicular to the plane of the bond.

All Conditions Recorded

Before the actual tensile testing, a full report of the bonding details is prepared, showing room temperature and relative humidity at the time of the adhesive application and at the time of the bonding. Other pertinent data are: condition of the adhesive-viscosity, solids content, date of manufacture, lot number, elapsed times between cleaning and adhesive application, between adhesive application and bonding, and between bonding and testing, and time temperature, and pressure during bonding.

The full width as-bonded specimen can be pulled if desired. During the test, the two 3-in. long unbonded ends of the test panel are gripped in the jaws of the Baldwin machine. The specimen is



Test specimen . . .

Let's find out how to solve YOUR stamping problem:

If your company uses reasonable quantities of formed parts in steel, steel alloys, brass, inconel, magnesium, aluminum, or titanium, you have a problem: should you **make** or **buy** the stampings you need? To make the **right** decision — a decision that may **save** or **cost** your company many thousands of dollars — you must ask and answer many questions on labor force, plant space, machinery, costs, design, operations, production level, future volume.

We would like to help you reach a good decision, favorable to your company's long-run profit picture.

At this moment, **we don't know the answer** to your problem — but **let's find out!** Since no two stamping jobs are ever exactly alike, **Presteel** is proud of being able to offer a proven procedure to arrive at the right answer. Our engineers, backed by Worcester Pressed Steel's 72 years of intensive stamping experience, will sit down with you at your convenience, isolate the facts that count, and help you get all the basic information for you to make an impartial, sound decision.

For a "Make it, or Buy it" consultation with a Presteel representative, write us today. There is no charge or obligation.

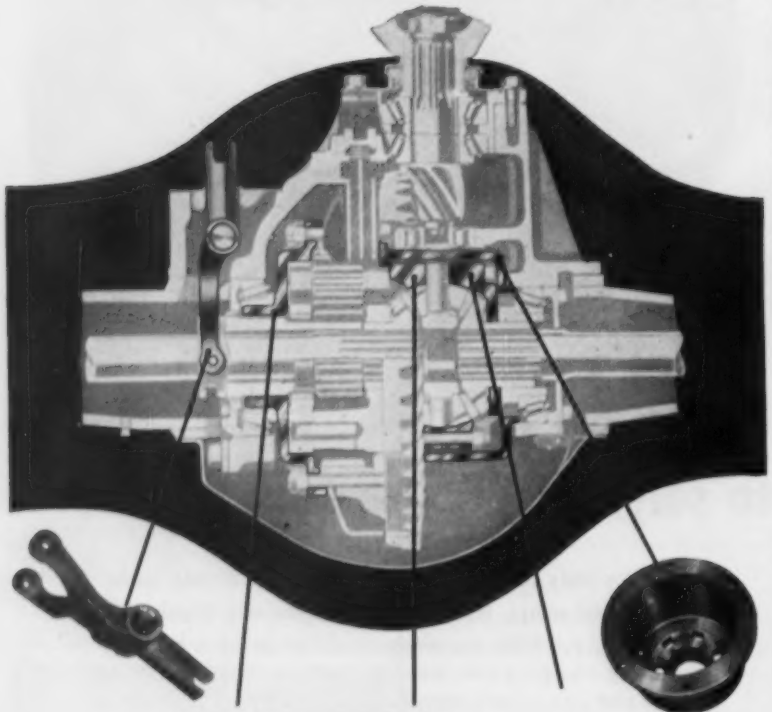
Your part has a precedent at Presteel.

Worcester Pressed Steel Company
626 Barber Ave., Worcester 6, Mass.

Please ask your representative to call. ☐

Name_____
Title_____ Company_____
Street_____
City_____ Zone_____ State_____

for **HEAVY DUTY** service



PEARLITIC MALLEABLE CASTINGS

The 2-speed truck axle is a *must* under varying load and road conditions because it provides a tailor-made ratio for every condition. But it takes a severe beating under heavy duty conditions encountered in logging, mining, farming, etc.

That's why Eaton Manufacturing Company, leading producer of 2-speed axles, specifies pearlitic malleable — from National — for several vital parts. For Eaton knows that pearlitic malleable has high ultimate strength . . . resists wear under heavy loads at high speeds . . . possesses excellent non-seizing properties. In addition, pearlitic malleable can be given a smooth finish . . . can be either liquid or air quenched. And perhaps *most important of all, pearlitic malleable machinability index ranges from 80 to 90* (B1112 steel = 100).

Look your product over critically. Pearlitic malleable castings—from National—can replace costlier fabrication methods . . . can offer opportunities of reduction in weight, machining and assembly time. AA-1197

Photos: Courtesy Eaton Manufacturing Company

NATIONAL MALLEABLE AND STEEL CASTINGS COMPANY

Cleveland 6, Ohio

The Nation's largest independent producer of malleable and pearlitic malleable

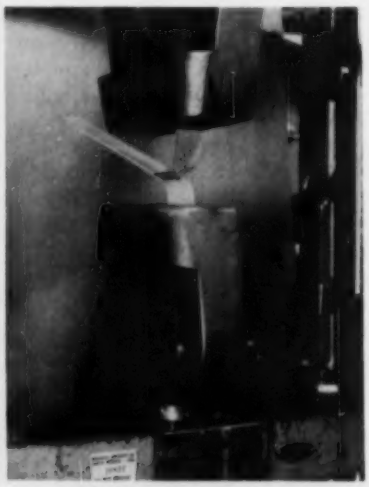
peeled apart at a jaw separation rate of 2 fpm, separating the bond at a rate of 1 fpm.

Strain Gage Used

An autographic record of load vs. crosshead motion is obtained. For most peel tests a 100-lb tall scale is adequate.

Dr. Leo Schapiro, supervisor of Douglas' Materials Laboratory, points out that in testing the yield strength of a piece of metal it is necessary to have an extensometer or SR-4 gage on the specimen itself, because a definite gage length is needed to calculate the yield strength. In the case of the peel test for metal adhesives a gage length is not required since strain in the test specimen is not being measured.

By visual examination of the test record, average peel strength is estimated in pounds per inch width of specimen. If the entire specimen is peeled apart, generally the initial and final portions



Sample in machine . . .

After the pull . . .

Many types of failure can be determined with this test method . . .

of the curve will have high peaks. These are not considered in determining the average peel strength because they are characteristics of the test and not properties of the adhesive.

Types of Failure

In addition to the average peel strength, average adhesive film thickness and type of failure are equally important observations that can be made by this test. Types of failures include: 1. Adhesive failure between surfaces of metal and adhesive or adhesive primer; 2. Bubbles or porosity; 3. Cohesive failure, within the adhesive; 4. Dow film failure, or failure of similar oxide or primer on the metal surfaces; 5. Metal failure; 6. Primer failure between surfaces of adhesive primer and tape; 7. Unbonded areas as a result of trapped gases or lack of pressure which prevented contact between metal and adhesive.

Dust Control:

Dust-settling chambers keep Canton's air clean.

About four tons of iron oxide dust would be blown into Canton's atmosphere every week if it were not for a large dust-settling chamber on the roof of the Hot Scarfing Building at The Timken Roller Bearing Co.'s Canton steel mill. The big chamber each week settles 7000 to 9500 lb of iron oxide and other dust particles—about 2 lb for each ton of steel processed by hot scarfing.

The hot scarfing operation is a recently adopted method of conditioning steel billets to remove imperfections. The surface of a heated billet is removed by melting with a flame from an oxygen torch which exposes defects. The velocity of the burning gas of the torch blows the molten steel and iron oxide dust into the throat of a ven-

CHIPPERS get longer, more comfortable protection

Rigid metal top bar holds sturdy nylon cups firmly—makes goggles much easier to handle, too!

Kover-Mor® Goggles designed for chippers are fitted with Willson *Super-Tough* lenses heat treated for greater impact resistance. Note how 4 screened eye cup ports admit air to keep lenses fog-free.

WILLSON

Kover-Mor® Goggles are roomy

. . . fit over large-frame prescription glasses

Kover-Mor® Chipper's Goggles are made of lightweight nylon with the highest *strength/weight ratio* known for goggle cups. Chippers say they have features that make them the most comfortable goggles of all.

Snug, easy fit is assured by adjustable two-piece headband, leather bridge curtain and metal top bar. Extra ventilation is provided by slots in screw caps *plus* ports in cups.

Standard 50 mm. round lenses fit Kover-Mor® Goggles. No need to stock odd-size replacement lenses! Lens changing is simplified by external screw caps.

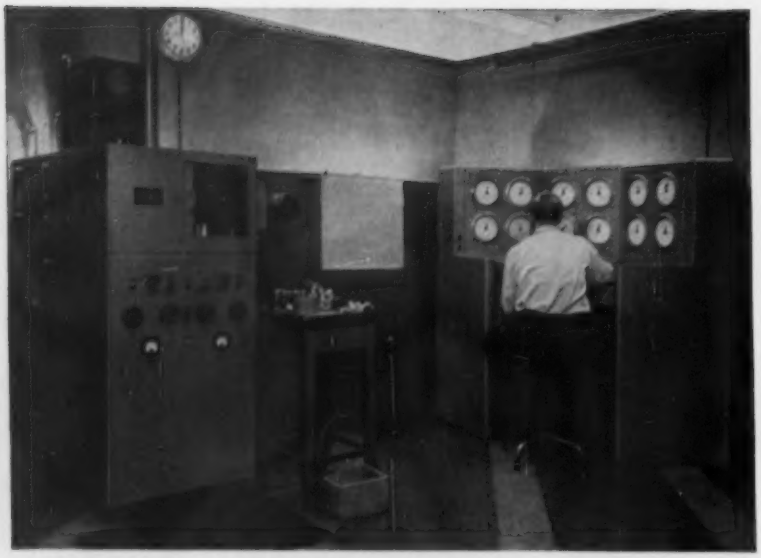
Ask your Willson distributor for Kover-Mor® Chipper's Goggles—available with opaque or clear nylon cups. They'll withstand toughest use.

More Than 300 Safety Products Carry This Famous Trademark

WILLSON

Leaders in Research and Development of Safety Products Since 1870

WILLSON PRODUCTS, INC., 231 WASHINGTON ST., READING, PA.



QUALITY CONTROL FOR MASS PRODUCTION. Days have been chopped to minutes by the installation of such equipment as this direct-reading spectrometer which can analyze beryllium copper alloys while they are still molten.

NEW MANUFACTURING FACILITIES INCREASE PRODUCTION, IMPROVE QUALITY OF "BERYLCO" BERYLLIUM COPPER

The production of beryllium copper, that uniquely versatile alloy which does so many jobs so well, has always been a complicated process. Beryl ore must be processed chemically to produce beryllium oxide. Master alloy is obtained by subjecting beryllium oxide, copper powder, and carbon to high temperatures in electric arc furnaces. Subsequent operations include ingot casting, soaking, annealing, pickling, hot and cold rolling, and drawing.

New technological advances—represented by a multimillion-dollar new investment in plant and equipment by The Beryllium Corporation—have successfully adapted basic quality control to large-scale production. Users of "Berylco" will reap the benefits. The spectrometer shown above, for instance, enables very close chemical control to be exercised in the production of the various beryllium copper alloys. New rolling mills produce strip to closer tolerances while enhancing over-all quality. These and other new tools produce sizes and forms not previously available —and in many cases have achieved economies which have already been passed on to users.

Write for engineering help or sample testing material.

ORE GRINDING MILL—a part of the fully integrated "Berylco" facilities.

NEW COLD-ROLLING STRIP MILL finishes beryllium copper to close tolerances.

BERYLCO®

THE BERYLLIUM CORPORATION

DEPT. 5F, READING 6, PA.

STOCKED BY WAREHOUSE DISTRIBUTORS THE COUNTRY OVER

tilating system which carries it out of the building.

Particles Settle Out

Instead of the exhaust gases being blown into the atmosphere, 30-hp blowers, one at each of the four scarfing operations, blow the oxide-laden gases into a large air duct—8 ft square and 120 ft long.

Due to the huge size of the duct, the velocity of the gases is decreased and the heavy particles settle out. Next, the gases are conducted through a baffled settling chamber, 16 ft high, 24 ft wide, 32 ft long, where the air-borne particles are trapped. The cleaned gas then is exhausted into the atmosphere.

Hoppers Emptied Weekly

The settled material is collected in two large hoppers which are emptied once a week. The by-product, mainly iron oxide, can be used to replace iron ore in the electric furnaces in the Melt Shop.

A look at the boiler house and steel mill stacks anytime at The Timken Company will show the effectiveness of this equipment. And,

Hot scarfing operation . . .

Iron oxide recovered . . .

Photoelectric device inside stack sets off alarm . . .

if for some reason, heavy smoke starts to blow from the stack, the boiler attendant knows about it right away. A photo-electric device inside the stack sets off an alarm and red light. Then the attendant can find out what's wrong and correct it immediately.

Keeping these thousands of pounds of dust out of the air is a giant step forward in the company's cleaner-air program.

Fuels:

Reactor element uses mix of uranium-aluminum.

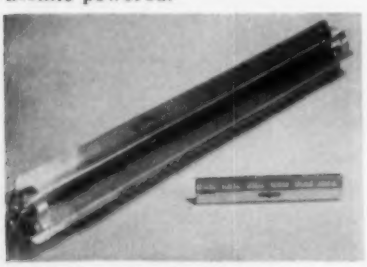
An unclassified atomic fuel of advanced design fabricated by Sylvania Electric Products Inc. for use in the research reactor at the Brookhaven National Laboratory was shown to the public for the first time recently.

The fuel element while radioactive is safe to handle, prior to being used in a reactor. When fuel elements are placed in a reactor in sufficient numbers, and under the right control conditions, atomic fission is produced.

Uranium-Aluminum Mix Used

The fuel element consists of three aluminum-clad fins approximately 30 in. long and held together at the ends by aluminum rings approximately 2½ in. in diam. The fins are bent at an angle. Inside the aluminum cladding or covering is a thin layer of a uranium-aluminum mix.

Sylvania scientists predict that at least one-half of the new electric generating stations built in the United States in 1980 will be atomic powered.



Reactor fuel element . . .

Unusual
IS THE WORD FOR THESE STAINLESS STEEL BLANKS . . .

Not Unusual
IN PRODUCTION AT . . .

No matter how you look at it, these heavy gauge Blanks are unusual.

Unusual because they are made of Type 302 stainless steel. Unusual because they are 5" thick x 7¾" ID x 78½" OD and weigh approximately 7000 pounds each. Unusual because each required special cutting and machining to produce its rough machined shape. But such jobs are *not unusual* at G. O. Carlson, Inc.

As specialists in working stainless steel, Carlson provides an unique service for you

. . . by having skilled workers produce your stainless shapes.

. . . by making full use of the specialized cutting and machining equipment at Carlson.

. . . by giving you exactly what you want "on time" to keep your production running smoothly.

. . . by eliminating shipping charges on material you cannot use.

Put your stainless steel plate requirements in good hands . . . that means, G. O. Carlson, Inc.

Stainless Steels Exclusively

G. O. CARLSON, INC.

Plates • Plate Products • Forgings • Bars • Sheets (No. 1 Finish)

THORNDALE, PENNSYLVANIA

District Sales Offices in Principal Cities

Machining:

Downtime reduced with improved cutting tools.

Use of a newer grade of carbide in a triple-operation setup recently for machining aircraft turbine wheel hubs of Inconel X at Kelsey-Hayes Wheel Co., Jackson, Mich., cut per piece time by 2 minutes, eliminated machine downtime by 100 pct and approximately doubled both tool life and production.

The job at Kelsey-Hayes consisted of drilling, turning and facing the Inconel X forging, 6⅝-in. on the outside diameter and 1⅜-in. thick, in one operation. The irregular surface of the forgings sometimes gave contour variations up to ⅛-in., making the work extremely rough on cutting tools.

Tool Life Jumped

Before using Carboloy grade 370 cemented carbide cutting tools on the job, over 5 minutes was required to machine each hub. Because of the constant regrinding of the cutting tools used, the 12-in. Fay automatic was shutdown half the time, and top production per hour was 10.6 pieces.

Use of the newer grade of carbide cut the time per piece from 5.652 minutes to 3.607 minutes, jumped tool life by 50 pct thereby reducing machine downtime, and increased production from 10.6 to 19.6 pieces per hour.

Lathe Run at 58 rpm

The operation on the lathe was run at 58 rpm with the feed and depth of cut on both turning and facing set at 0.144 and 3/16-in. respectively.

Both grade 370 carbide tools used are of the standard type, measuring ¾ x ¾ x 4½ in. with a nose radius of 1/32-in. on the 3/16 x 7/16 x 13/16-in. cutting tips. The facing tool includes a 15° lead angle. No lead angle is used on the turning tool.

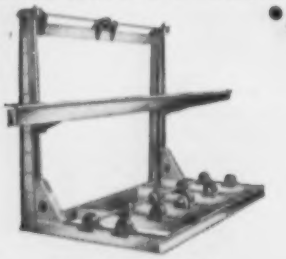
Machining Inconel X . . .

Wheel hub forging . . .

WEBB TANK PRODUCTION MACHINERY

The WEBB Corporation is the only manufacturer to offer a complete line of machines and fixtures built exclusively for the tank fabricator. Designed for use with manual, semi-automatic or full automatic welding processes. These machines are built for rugged use, using welded steel construction wherever possible.

In selecting a time-proven product of the Reed Equipment Division, you are buying guaranteed performance and a machine designed to do your work efficiently and economically.



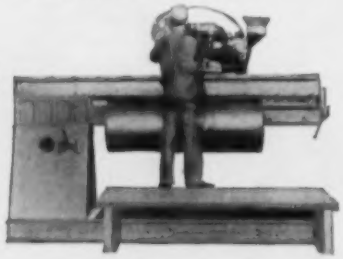
UNIT TYPE ROLL

A complete line of Unit Type Track Supports and Turning Roll Fixtures can be provided for the welding of longitudinal and girth seams of cylindrical vessels, to 12' in diameter and weighing up to 9 tons.

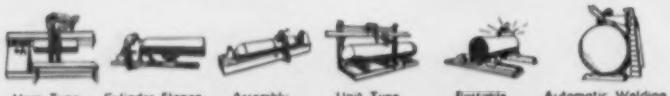
The unit is of all steel construction and all critical surfaces are machined to insure accuracy.

These fixtures are widely used for single pass automatic longitudinal seam welding, using closed butt joints. This is designed primarily for cylindrical shapes and will also handle flat work and conical shapes. The material is clamped firmly in the jig in contact with the water cooled back up bar.

Machine is of all steel construction.



SEAM WELDER



Horn Type Fixtures | Cylinder Flange Offsetters | Assembly Fixtures | Unit Type Turning Rolls | Portable Turning Rolls | Automatic Welding Track Supports

FOR ILLUSTRATED LITERATURE WRITE DEPT. E

REED EQUIPMENT DIVISION
THE WEBB CORP. WEBB CITY, MO. U. S. A.

New Books:

"A Company Guide to the Selection of Salesmen," by M. M. Mandall. Chapters include: The Man and the Job, The Recruitment Process, Selection Devices, Problems of Program Construction, Organization and Administration. American Management Assn., 330 West 42nd St., New York 36. $4.75. 161 p.

"The Practical Engineer," edited by N. P. W. Moore. Sixty-fifth edition. A pocket type book of extensive reference data on engineering subjects. Contains brief German-English, French-English, and Spanish-English dictionaries. Pitman Publishing Corp., 2 West 45th St., New York 36. $3.00. 744 p.

"Economics and Public Policy." Brookings Lectures of 1954. Six leading economists examine the usefulness and limitations of economic theory for the guidance of policy. The Brookings Institution, 722 Jackson Place, N. W., Washington 6, D. C. $2.00. 157 p.

"The Vertical Pump by Johnston." A complete and authoritative book on the vertical turbine pump. Discusses pump selection, basic design principles, operating characteristics. Johnston Pump Co., 3272 E. Foothill Blvd., Pasadena, Calif. $10.00. 392 p.

"Causes of Cracking In High-strength Weld Metals," presents data on studies involving SAE 4340. Relationship between hot cracking and low hot ductility shown. Part I, PB 111531, $1.25; Part II, PB 111532, $1.25. Office of Technical Services, U. S. Commerce Dept., Washington 25, D. C.

"Company Experience With Major Medical Expense and Products Liability Insurance." Discussion of two coverages which are of increasing importance to industry. American Management Assn., 330 West 42nd St., New York 36. $1.75. 44 p.

Perkins custom-made Gears *make any device—big or small, simple or complex—*

more efficient,
more serviceable,
more saleable...

because every human and mechanical advantage in Gear Making goes into their production—and all under management who have spent their lifetime in the Gear Business.

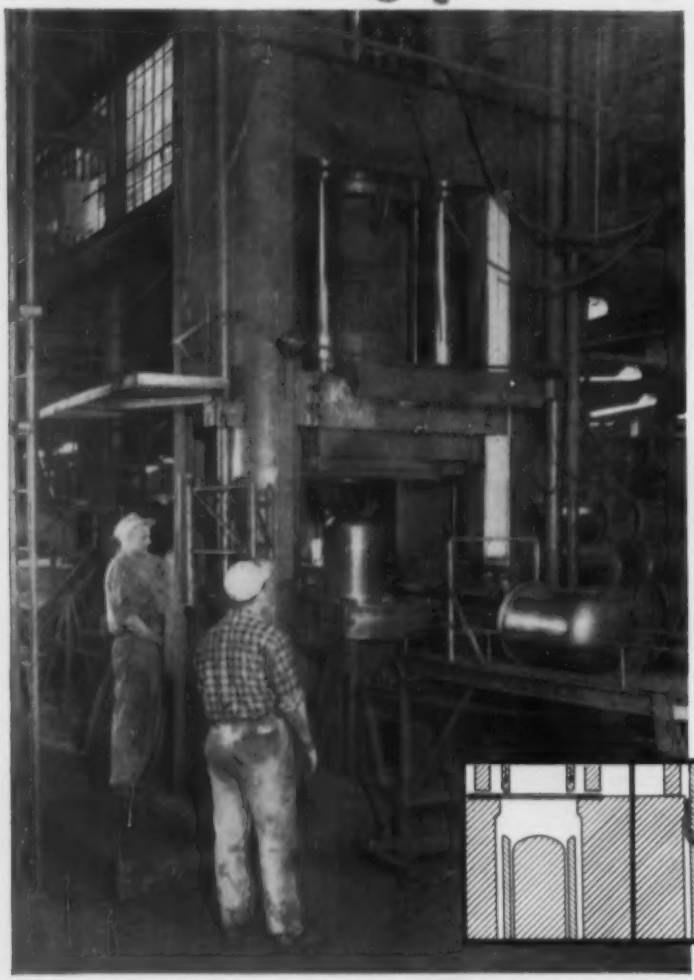
You furnish the specifications *we'll produce the gears!*

PERKINS MAKES:
to customers' specifications, in all materials, metallic and non-metallic: bevel gears, ratchets, sprockets, ground thread worms, spiral gears, helical gears, spur gears with shaved or ground teeth.

NOTE: The PERKINS PRECISION SPRING COILER is the latest development in the spring coiler field and eliminates entirely the use of arbors and long set-up time. It is a complete self-sufficient machine and enables you to make the spring you want when you want it — in seconds. The coiler produces any type of spring, in any diameter and any pitch with this range: Wire sizes .005 to .125. Diameter, from 3/32" to 12" and larger. Size of the compact coiler is only 7 1/2x16". A POWER MODEL is available. Information on request.

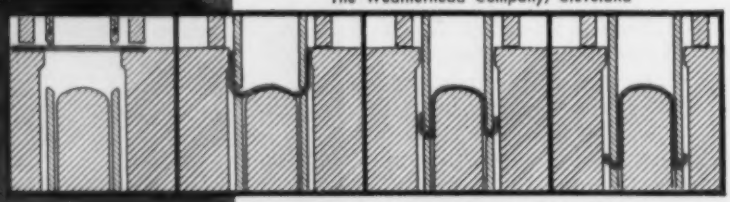
PERKINS MACHINE & GEAR CO.
103 Circuit Ave., WEST SPRINGFIELD, MASSACHUSETTS

Half-a-Cylinder IN ONE PRESS STROKE!



K. M. Wilmore, Plant Manager, The Weatherhead Co., reports on their success with an H-P-M press using the reverse draw method. *"Our 500-ton H-P-M has operated 'round the clock for months at a time during the past five years. We are very pleased with its performance in the manufacture of 100-pound capacity L-P Gas cylinders."*

K. M. Wilmore, Plant Manager
The Weatherhead Company, Cleveland



H-P-M 500-ton press drawing L-P Gas cylinders at Weatherhead.

In the reverse drawing method, this H-P-M press transforms a blank into a shallow cup. Then it literally turns the cup inside out as it continues the draw — all in one continuous stroke. It does the work of several presses; handling and heat-treating between draws are eliminated. Parts are uniform in thickness and quality . . . rejects are reduced to a minimum.

The H-P-M FASTRAVERSE press is infinitely adjustable, permitting the press to be easily and quickly regulated for each specific draw job. Accurate control of drawing speed, plus total elimination of high impact stresses, guarantees proper metal flow. Independent control of each hydraulic action provides just the right tonnage for each job. Investigate these versatile "all-hydraulic" production units. Draw your sheet metal hydraulically.

THE HYDRAULIC PRESS MFG. COMPANY
1006 MARION ROAD
MOUNT GILEAD, OHIO, U. S. A.

HPM

NEW EQUIPMENT

New and improved production ideas, equipment, services and methods described here offer production economies . . . for more data use the free postcard on page 113 or 114

Heavy stock removal on rough steel plates

This mammoth hydraulic reciprocating table type vertical spindle surface grinder removes heavy stock on large die blocks or steel plates up to 54 in. wide x 144 in. long, producing ground finish surfaces that eliminate the necessity of planing operations prior to final grinding. All parts of this double housing vertical grinder are made extra heavy and rugged to withstand the load generated by heavy grinding pressures with a 42-in. diam segmental grinding wheel driven by a 125 hp motor. Final flat grinding operation to precision tolerances and fine surface finish is done with the 42-in. wheel. *Hill Acme Co.*

For more data circle No. 30 on postcard, p. 113.

Testing machine for large plain bearings

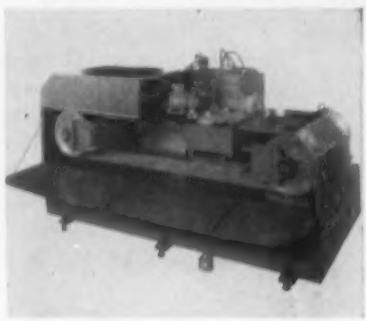
New bearing testing machine has been installed in the laboratory of Farrel-Birmingham Co., Inc., for full-scale testing of large plain bearings under conditions simulating as nearly as possible those in actual operation. Tests are made on bearings commonly used in company products, such as Banbury mixers, rubber and plastic mills and calenders, and rolling mills. The machine has a basic journal size of 14 in. diam. A maximum load on the bearing of 300,000 lb can be exerted, as produced through an hydraulically actuated lever system with actual force measured by strain gage. *Farrel-Birmingham Co., Inc.*

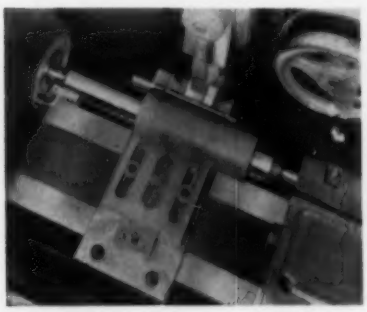
For more data circle No. 31 on postcard, p. 113.

Speed-surfacer boosts speed, uniformity

Cost-cutting advantages of increased speed plus positively uniform pressure on the work regardless of shape, and without expensive fixtures, are offered in a new ultra-speed surfacer. The unit is a coated-abrasive, belt-type surfacer, designed for producing a true, finished starting surface on rough castings. The machine features a magnetic platen which greatly increases grinding speed and assures uniformity of pressure on the work. The magnetic force is adjustable to accommodate different types of work. Work-turning device facilitates changing of pieces, provides grinding uniformity. *Fenlind Engineering Co.*

For more data circle No. 32 on postcard, p. 113.





Converts to a centerless grinder in minutes

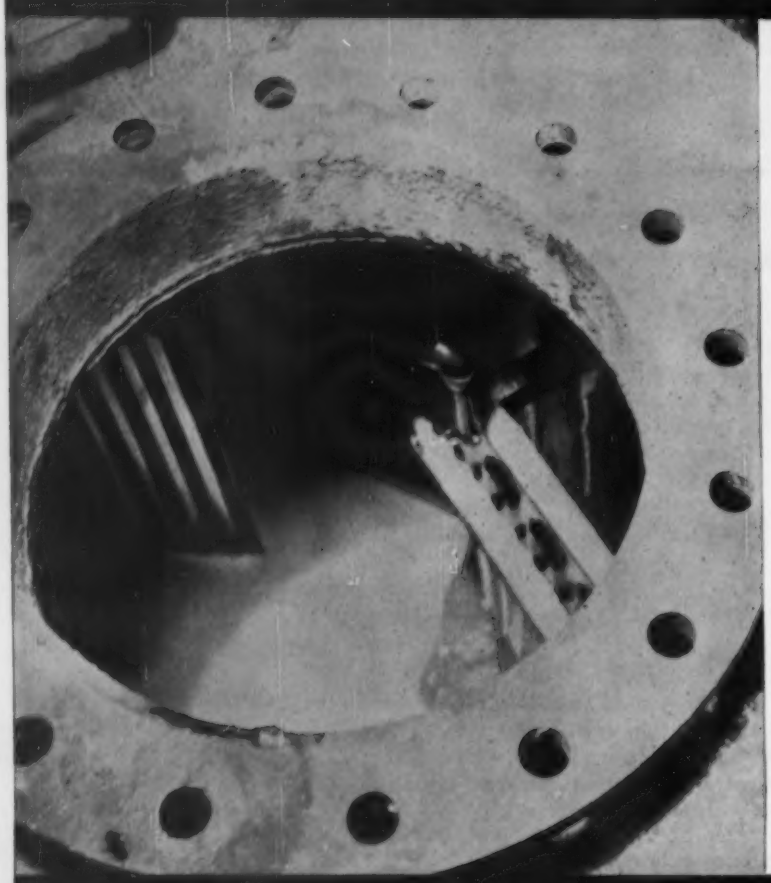
Any between-centers grinding machine can be converted to a centerless grinder with a new centerless grinding fixture. The unit provides all the elements necessary for accurate grinding of round work, without need of setting it up between centers. Centerless work operations, such as through feed, in-feed, plunge or form grinding are practical with the S&E fixture. It provides the functions of a large centerless grinder: the grinding wheel and an opposed regulating wheel form a throat through which the workpieces pass while being supported on a work rest blade. *S & E Machine Products, Inc.*

For more data circle No. 33 on postcard, p. 113.

Turn Page

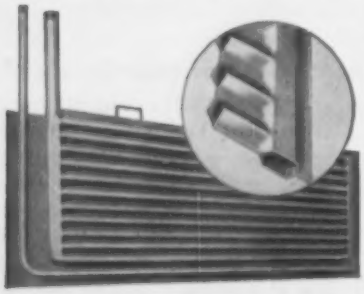
new PLATECOILS®

cost less than pipe coil repairs...



as Coil-itis* is cured in this Sherwin-Williams agitated tank

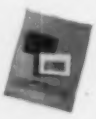
Platecoils have replaced a large circular pipe coil formerly used to cool alkaline slurry in an agitated tank at Sherwin-Williams Company. Installed on end, Platecoils are inserted or withdrawn through a manhole on the top of the tank. With pipe coils, it was necessary to remove the motor and agitator and the bolted-down tank top to make repairs. Cost of doing this just once exceeded the total cost of the 6 Tranter Platecoils now used. In addition, cooling is now accomplished without fouling of surface, which means the cooling is more effective and maintenance is decreased. Such outstanding savings are possible with Platecoils. Investigate them for your processes today. For heating as well as cooling, Tranter Platecoils are your best answer.



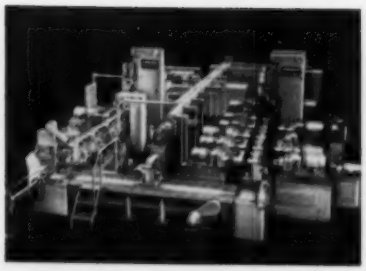
PLATECOILS *replace pipe coil for 50% of the cost*

*Besides reducing original costs, Tranter Platecoils frequently save 50% in maintenance costs. And production time is saved because Platecoils heat or cool 50% faster and payloads are increased because Platecoils take 50% less tank space. By overcoming the limitations of old-fashioned pipe coils, Platecoils cure Coil-itis.

Write today for a 12-company report on savings made by use of Tranter Platecoils. Ask for Bulletin No. P73.



PLATECOIL Div. TRANTER MANUFACTURING, Inc., Lansing 4, Michigan



139 operations performed on 170 pieces per hour

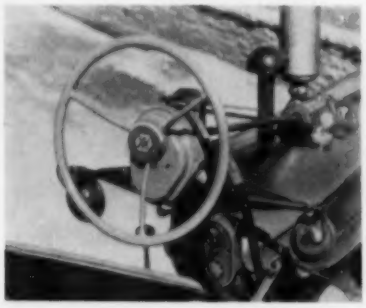
This special tool completely machines flywheel housing for both standard and automatic transmissions, except for grinding three faces. Either part may be produced as required. This flexibility for scheduling is made possible because the setup changes and the proper tools are selected automatically at each station. Because the parts are irregular in shape, special palletized workholding fixtures are provided. Pallets transfer automatically from station to station. *Cross Co.*

For more data circle No. 34 on postcard, p. 113.

Pack turnover speeds metal decorating operations

With a new pack turnover, tinplate and sheet metal can be coated or lithographed up to 25 pct faster by eliminating the need for turning over each sheet individually as it emerges from the drying or baking oven. Sheets are piled immediately as they come from the oven and a complete bundle is turned in one operation. At Caspers Tin Plate Co., Chicago, the new turnover has eliminated paddle wheel turnovers. Their removal has enabled substantial increases in processing speeds, speeds approaching 90 to 100 sheets per min being attained. Loads weighing to 6000 lb are handled, and sheet sizes range from 16 x 16 in. to 36 x 36 in. *Dexter Folder Co.*

For more data circle No. 35 on postcard, p. 113.



Power steering device for off-the-highway vehicles

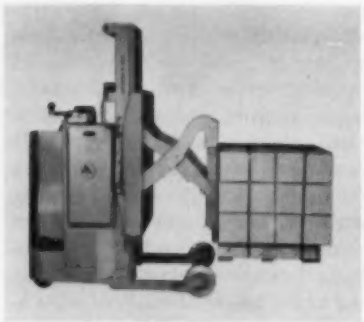
Designed to reduce the back-breaking job of steering such vehicles as hi-lift trucks and tractors to one-finger control, a new power steering device can be installed in 2 to 3 hr and without structural changes in existing vehicles. As original equipment on new vehicles it can be installed without retooling the manufacturing line. The unit permits full 360° steering, but contains a top power limit as a precautionary measure to insure that existing steering mechanisms are not damaged. Power is supplied from a small hydraulic pump which can be attached to the generator or distributor. *Westinghouse Air Brake Co.*

For more data circle No. 36 on postcard, p. 113.

Indexer features a 24-station index plate

New Roto-Indexer is said to give rapid, positive, accurate indexing. It takes the place of expensive jigs and fixtures in connection with milling, drilling, jig boring, grinding and slotting. Any or all stations of the hardened and ground 24-station plate can be blocked out. Made in 2 sizes—12 and 15 in. Four models: AC-12 has special 12-in. diam steel body chuck. AX-2 has 12 in. platen with a 4½ in. diam pilot. AH-12 has 12 in. T-slotted turn table. AL-15 has 15 in. T-slotted turn table. *Troyke Mfg. Co.*

For more data circle No. 37 on postcard, p. 113.



Extendable forks reach out for the load

The ReachMaster, a new riding type electric tiering truck equipped with hydraulically extendable forks, does not straddle the load to be picked up. The truck is positioned before the load and the forks are extended into the pallet. The pallet and load are then raised up over the wheels and retracted into the truck. To place a load in a storage rack, the truck and load are positioned before the empty space in the rack and the load is extended into the rack and dropped. Forks are then retracted from the pallet. The truck has 10-in. diam rubber tired load wheels for floor protection. Truck capacity is 2000 lb; can handle loads 48 in. long. *Lewis-Shepard Products, Inc.*

For more data circle No. 38 on postcard, p. 113.

Turn Page

another APEX time-saver

combination SOCKET-TAP for re-tapping and cleaning tapped holes

A damaged or clogged tapped hole can snarl up an assembly line in a hurry —but this Apex combination socket-tap will clear the trouble and get things moving again, even faster!

When the assembly line operator encounters a tapped hole which has been damaged or clogged with paint, gook or similar material, he merely uses an Apex socket-tap to quickly re-tap or clean the hole.

Standard socket-taps, with male hex drive, permit instant change from routine power tool operations to re-tapping or cleaning work. Tap sizes: ¼" to 1". Standard socket-taps, with female square drive, are recommended where separate power tool is available for re-tapping or cleaning. Tap sizes: ¼" to 1½". Pipe taps, with female square drive, in tap sizes from ⅛" Pipe FS to 1½" Pipe.

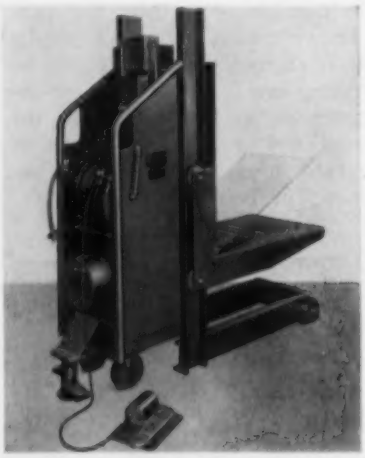
These and many other Apex production tools are described in Catalog 115; write, on your company letterhead please, for your copy.

APEX production tools

THE APEX MACHINE & TOOL CO.
1029 Patterson Blvd. • Dayton 2, Ohio

Stacker

Big brother to the Portelvator S stacker is this new model with similar appearance and stamina plus added features which fit it for extra heavy service. These include: roller equipped platform 20 x 36 in. with hinged cover plate; electric-mechanical lift through 3 hp crane hoist type motor; worm, worm gear, and screw power transmission; reversing magnetic starter; gear driven limit switch. Retractable power cable is on 15 ft spring



reel; retracting reversing foot switch, on 25 ft spring reel. Platform operating speed is 58 ipm; platform travel, 41 in. The stacker has load capacity of 3000 lb. *Hamilton Tool Co.*

For more data circle No. 39 on postcard, p. 113.

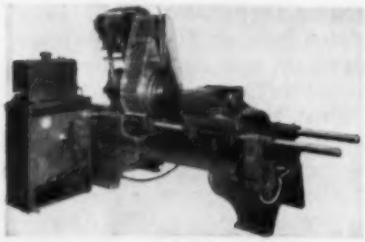
Metal filler compound

An aluminum based, putty-type metal filler compound tradenamed destiMETAL, is a metal alloy in plastic form which can be applied without heat, as a filler, to other metals, wood, plastics, fiber glass and plaster. In its straight form it can be used as a permanent metal-filler for fractures, cracks, holes, cavities in castings, extrusions, stampings, and forgings. It can be molded to any desired shape for temporary tooling purposes such as molds and dies. When thinned with its solvent, destinSOL, it can be sprayed on as a coating or lining. *Destiny Products Co.*

For more data circle No. 40 on postcard, p. 113.

Rotary swager

The Steven & Bullivant cold pointing machine, available for lighter applications, is a 4-die fixed head inverted rotary swager. It is available in four sizes for tube from ½ to 6 in. diam. The four piece dies are mounted in a fixed head and do not rotate. Maintenance costs are



low due to absence of any centrifugal force acting on the hammer block and dies. No chips or scale are thrown outward and onto annular rolls. An air blast from the rear of the machine keeps the dies clean. Die change can be easily made in from 1 to 2 min. Machines can be supplied with hydraulic power feeders for production jobs. *Abbey Etna Co.*

For more data circle No. 41 on postcard, p. 113.

Aluminum billet heaters

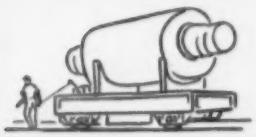
This model in a new line of aluminum billet heaters embodies several new features such as an improved coil design, a new billet stop and thermocouple assembly, rounded corners and built-in capacitors.

Need for mounting or wiring capacitors in the field is eliminated, the capacitor compartment becoming part of the heater structure. The CSC Model is available in all models up through 350 kw. *Magnethermic Corp.*

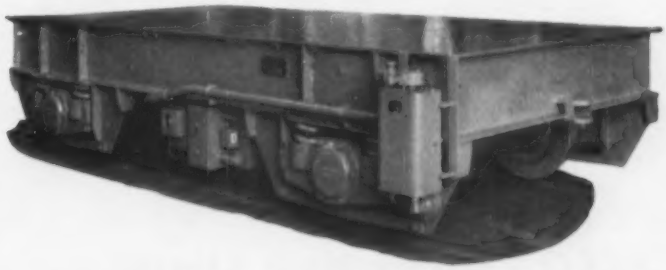
For more data circle No. 43 on postcard, p. 113.

Turn Page

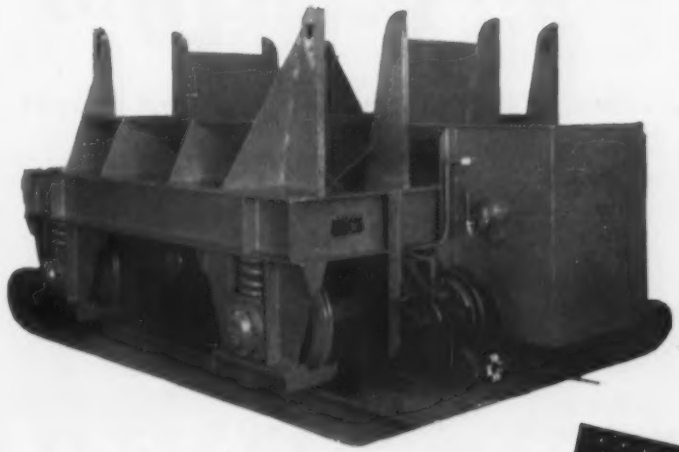
TRANSFER IT SAFELY *at Less Cost with* ATLAS



Atlas Safety-Type Transfer Cars are outstanding for moving heavy materials over short distances. Designed for storage battery, diesel or gas-electric, or cable reel service. Only one simplified control lever for safety. The car moves only when the operator holds the lever.



50-TON STORAGE BATTERY FLAT CAR



64-TON ELECTRIC FLAT CAR

Request "Walk-Along" Bulletin 1283

THE ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS

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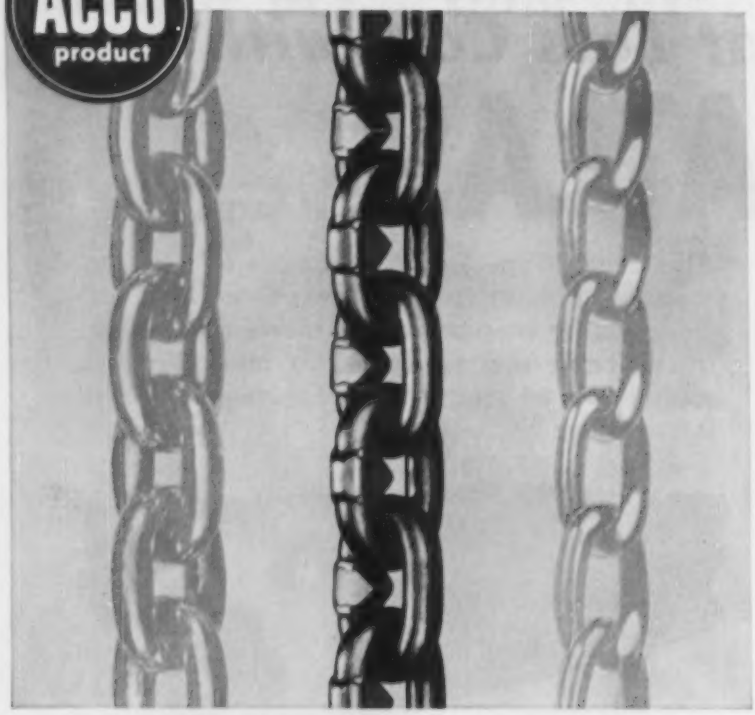
American Chain



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. . . the Chain that Identifies Itself

You can spot it instantly! Even in the company of other fine AMERICAN-made chains, the great new **Accoloy X-Weld125** chain identifies itself on sight by its unique link formation. Each link's big, outsize welded area is 2¼ times that of links welded by other processes.

Accoloy X-Weld 125 has welds as strong or stronger than the alloy material . . . welds that won't break when links are bent sharply . . . welds whose projecting lugs prevent dangerous kinking of the chain. These chains hang straight as a die. And they have greater strength with less weight!

These great chains—in ¼", ⅜", ½", ⅝" and ¾" sizes—are ideal for slings, bundling, towing, general utility chains. Write American Chain Division, York, Pa., for descriptive bulletin.

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Better Value

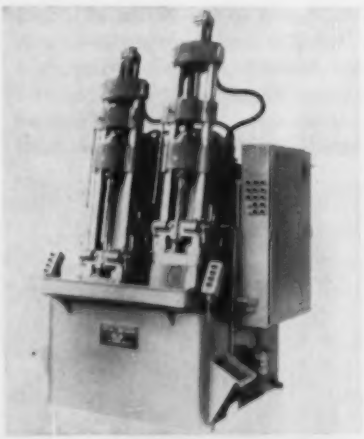
Copper-colored finish

A new copper-like porcelain finish for steel products has the beauty and warmth of copper plus the durability of porcelain enamel. Called Coppertan, the finish was perfected in cooperation with Samuel Stamping & Enameling Co. which uses it on built-in kitchen ranges and upright gas ranges. To produce Coppertan finish, a light colored base of Titania covercoat enamel is first applied over fired ground-coat enamel. While this is still wet, shading is oversprayed in any desired pattern, using a darker color covercoat enamel. After application, the product is fired in a furnace at 1500°-1520°F for 3 min or as required. The end result is a porcelain enamel finish that will not tarnish nor scratch and is acid-resisting. Coppertan can be made in gloss or satin finish. *Pemco Corp.*

For more data circle No. 43 on postcard, p. 113.

Threads large nuts

The Scru-Broach is a production machine for tough threading operations in large nuts, especially those having fast leads. Such parts as lead nuts and nuts for circulating ball type screw assemblies can



be threaded quickly and accurately. The machine works with a special type of broaching tool that has the appearance of a tap, but the cutting action of a broach. This tool is easily sharpened by grinding the faces of the teeth in the flutes. The teeth are not form-relieved, and therefore can be sharpened repeatedly without changing the size or

LET SIMMONS

form. The Scru-Broach is built with one, two or four work columns, depending on production requirements. *Ex-Cell-O Corp.*

For more data circle No. 44 on postcard, p. 113.

Foundry shell fusers

Largest of a new line of pin-type foundry shell fusers accommodates molds up to 48 x 48 in. The smaller machines, 16 x 20 in. and 20 x 30 in. mold sizes, are designed for molds up to 9 in. deep; the larger

machines are made to order for whatever maximum depth is required. Pins with spring-loaded ends are placed in various positions to suit any particular shells to be joined in the fuser. Paste or shell mold resin is placed on one of the two hot shells, and the shells are placed together in the fuser. The fuser is then closed on the mold by means of an air valve. When the shells are securely bonded, after 20-30 sec, the air valve is opened and the finished mold is removed for pouring. *Shalco Engineering Corp.*

For more data circle No. 45 on postcard, p. 113.

Anti-seize compound

New "dag" Dispersion No. 217 is a ready-to-use paste of semi-colloidal graphite in a special carrier, developed specifically as an anti-seize and sealant for high-pressure oxygen systems where line pressures reach 2000 psi, and temperatures range from 160° to −65°F. It is non-inflammable, even in the presence of high-pressure oxygen at temperatures of 575°F and higher. *Acheson Colloids Co.*

For more data circle No. 46 on postcard, p. 113.

Turn Page

For cost-cutting answers to any door need, see these
TWO NEW CATALOGS!
KINNEAR
KINNEAR ROL-TOP DOOR
Kinnear Steel Rolling Doors
With the coiling upward action of the interlocking steel-slat curtain, originated by Kinnear
Kinnear Rolling Fire Doors
All-steel "Akbar" Doors, famous for safety features and labeled by Underwriters Laboratories, Inc.
Kinnear Steel Rolling Grilles
A protective, attractive openwork of steel bars and links—admits light, air and vision
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Special rugged motors for time-saving push-button door operation
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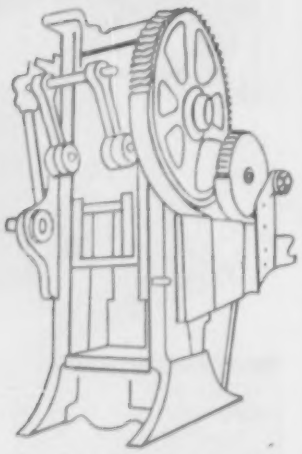

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TOOL COLUMBIA STEELS

Automatic arc control

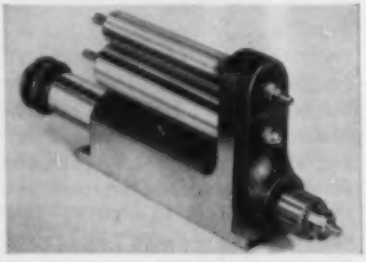
Controlarc, a new magnetic amplifier-rectifier DC welder is said to provide full time automatic arc control under all conditions. Available in 200, 300 and 400 amp models, the Controlarc automatically and continuously adjusts the selected arc characteristics to every change in welding condition,

from arc strike to end pass, assuring easy, clean arc strikes; hot starts and immediate penetration; uniform fusion and steady rate of metal deposit; prevention of arc "pop outs" and current drop-off during pass. Automatic control is made possible by the self-saturating magnetic amplifier that constantly analyzes welding voltage and automatically adjusts welding current to arc changes. *Vickers Electric Div.*

For more data circle No. 47 on postcard, p. 113.

Precision drilling unit

The Lynmatic 101, a precision drilling unit, is engineered for rugged simplicity and extreme versatility to be used on most types of materials. The air feed drilling



head has many features including an adjustable hydraulic feed control that permits rapid traverse to the work and quick return; drill-

FOR AUTOMATIC CYCLES IN PRODUCTION MACHINES:

ing to 2 in. centers and double row ball thrust bearings. Sides and bottom are machined square and parallel to the spindle to close tolerances to simplify alignment of the drilling unit on either single or multiple setups. *Lynco Inc.*

For more data circle No. 48 on postcard, p. 113.

Increased cutting speed

Blue Flash raised hub disk-wheel delivers substantial increases in cutting speed. Construction changes aimed at the fastest cutting rate possible, take maximum advantage of the cutting ability of each abrasive grain, permit them to penetrate deeper and take bigger bites of metal. In action, the

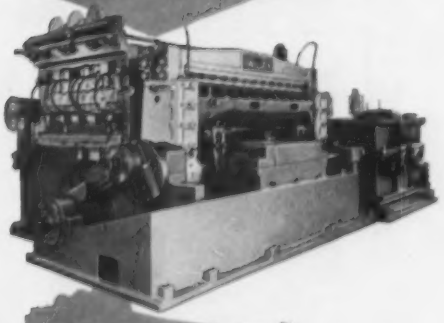
wheel is said to have a new sharpness that results in faster metal removal with less work pressure. This sharpness also exists on the entire underside of the wheel, permitting easy grinding and blending of external corner welds and convex surfaces. *Bay State Abrasive Products Co.*

For more data circle No. 49 on postcard, p. 113.

Iron powder electrodes

Designed for high speed production welding of lap, fillet and flat-beveled joints, the new Sureweld iron powder electrodes are said to cost less to use and provide up to 25 pct faster welding than E-6012 and E-6020 electrodes of the next larger size used at higher speeds. They produce welds with higher impact values, greater crack resistance, and deeper penetration. Low spatter rate, smooth bead surfaces and easily removed slag virtually eliminate clean-up and finishing operations. *National Cylinder Gas Co.*

For more data circle No. 50 on postcard, p. 113.

AUTOMATIC SHEARS
by HALLDEN
flexible design
cutting accuracy
continuous feed
rugged construction

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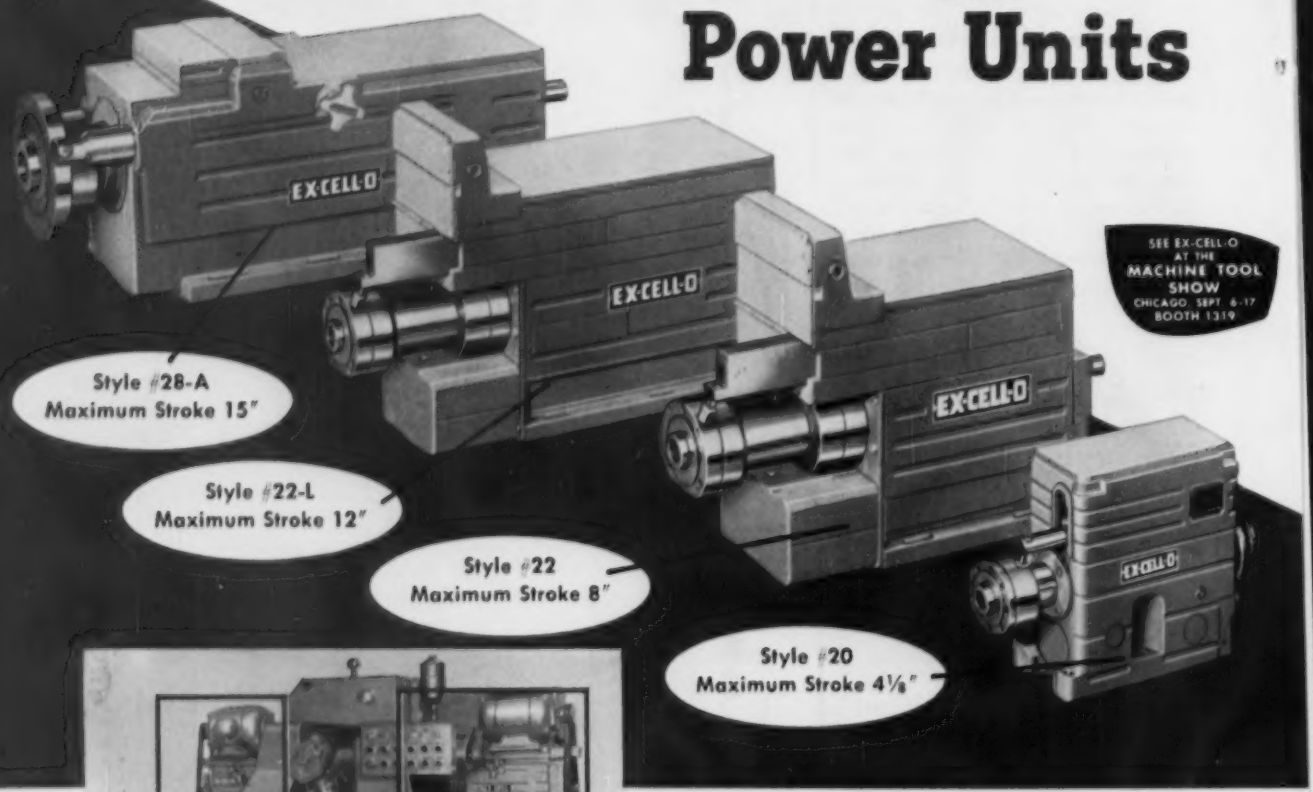
PRODUCTION MACHINES:

Ex-Cell-O Quill-Type Power Units

XLO
EX-CELL-O for PRECISION


EX-CELL-O
EX-CELL-O
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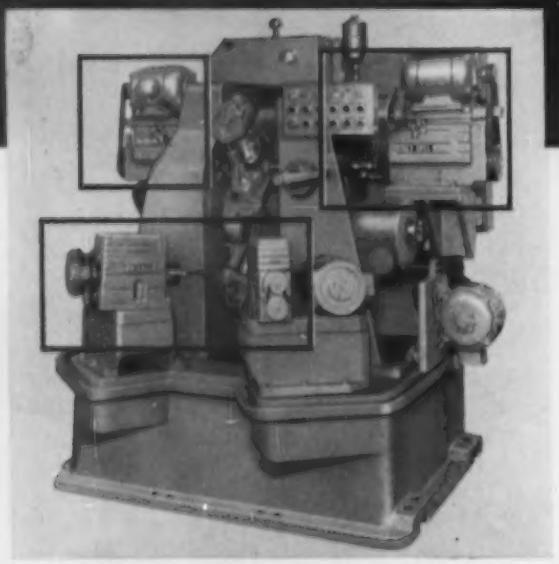
EX-CELL-O
SEE EX-CELL-O AT THE MACHINE TOOL SHOW CHICAGO, SEPT. 6-17 BOOTH 1319
Style #28-A Maximum Stroke 15"
Style #22-L Maximum Stroke 12"
Style #22 Maximum Stroke 8"
Style #20 Maximum Stroke 4⅛"



This special machine with automatic indexing fixture core-drills piston pin holes and drills angular oil holes. It uses six Ex-Cell-O Power Units (shown without belt guards) operated from a central push-button station.

Ex-Cell-O Hydraulic Power Units feed and rotate cutting tools in easily controlled automatic cycles. They actuate single tools or multiple spindle heads for such operations as drilling, reaming, counterboring and spot-facing. Hydraulic operation provides smooth, powerful movements.

A machine utilizing Ex-Cell-O Power Units can be very simple, with manual loading and clamping. Or it can be designed with work handling equipment for automation . . .

For complete information, including specifications and installation drawings, ask your Ex-Cell-O Representative or write Ex-Cell-O in Detroit.

EX-CELL-O CORPORATION DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES • CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

55-13

The Iron Age SUMMARY . . .

Steel wage negotiations are nearing a climax this week . . . Outcome will be hard compromise for both sides . . . Steel expansion is coming.

Down To Cases . . . Steel wage negotiations get down to the facts of life this week. And they are just as hard as they ever were. Before the shouting is over, both sides will be forced to make a tough compromise.

As previously estimated by IRON AGE, steel wages will go up between 10¢ and 15¢ an hour. Compensating price increases will average $4.50 a ton. Individual product advances likely will range from $4 to $6 a ton.

No Easy Compromise . . . Steel labor and management are not too far apart on their ideas of what the final settlement will be. Both are realistic enough to know that original offers and demands are just the opening gun for down-to-earth bargaining. But the compromise will not come easily. Both sides have their problems.

Dave McDonald of the steel union will press for all the traffic will bear because (1) this is his chance to get a healthy wage boost without compromising on other issues; next year he'll have the guaranteed wage, pensions, and social insurance as well as wage rates: (2) he wants to outshine the autoworkers on wages, and (3) he's got internal political problems that can be eased by a bargaining victory.

Industry Problems . . . The steel companies know that McDonald will be back for more next year. And they also know that higher labor costs can only be paid for by higher prices for steel products. They're worried about the inflationary effect of rising wages and prices.

Steel producers also face the necessity of financing another round of capacity expansion. The industry realizes that present capacity is not enough to handle peak civilian requirements with a safe cushion for unexpected defense needs. The current boom, based almost entirely on civilian demand, has forced near-capacity operations without denting backlogs.

Record Output Scheduled . . . The new expansion program will add about 13.7 million tons to ingot capacity between now and 1959. IRON AGE estimates that by 1959 the industry will have a rated capacity of 139.5 million tons (See p. 53).

Steel output this week will set an all-time record if production schedules are maintained. IRON AGE estimates an operating rate of 97.5 pct of capacity, up 1 point from last week. On a tonnage basis this would be approximately 2.35 million, compared with the previous record of 2.345 million set the week beginning May 9.

Steel Output, Operating Rates

	This Week†	Last Week	Month Ago	Year Ago
Production (Net tons, 00 omitted)	2,351	2,327*	2,340	1,680
Ingot Index (1947—49=100)	146.3	144.8*	145.5	104.6
Operating Rates				
Chicago	98.5	98.0	99.5	82.5
Pittsburgh	101.0	100.0	97.0	69.0
Philadelphia	97.5	95.3	98.0	60.0
Valley	99.0	95.0	98.0	67.0
West	99.6	98.4*	102.9	76.0
Detroit	97.0	94.0	96.0	84.0
Buffalo	105.0	105.0	105.0	67.5
Cleveland	104.1	103.0	104.4	67.0
Birmingham	93.5	94.0	96.0	76.0
S. Ohio River	84.0	84.4*	72.2	82.5
Wheeling	99.0	101.0	97.0	90.0
St. Louis	106.4	102.0	106.1	34.5
Northeast	89.0	90.0	90.0	58.5
Aggregate	97.5	96.5*	97.0	70.5

*Revised. †Tentative

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	4.797	4.797	4.797	4.634
Pig Iron (Gross ton)	$56.59	$56.59	$56.59	$56.59
Scrap, No. 1 hvy (gross ton)	$35.33	$34.00	$34.00	$27.58
Nonferrous				
Aluminum, ingot	23.20	23.20	23.20	21.50
Copper, electrolytic	36.00	36.00	36.00	30.00
Lead, St. Louis	14.80	14.80	14.80	13.80
Magnesium, ingot	29.25	29.25	29.25	27.75
Nickel, electrolytic	67.67	67.67	67.67	63.08
Tin, Straits, N. Y.	94.50	93.50	91.50	94.125
Zinc, E. St. Louis	12.50	12.00	12.00	11.00

Carryovers Posing Problems

Heavy carryovers on sheets, bars and plates are proving a headache to producers . . . Light plate demand is up . . . Railroad carbuilders will use more products.

◆ ONE OF THE biggest problems confronting steel producers is the heavy carryovers on such products as sheets, bars, and plates. Even though some mills are deducting June carryover from July tonnages, they will still be behind on deliveries going into August.

In an effort to spread the load on sheets, one large producer has placed a limited restriction plan into effect on a district basis. This applies to what space will be left in fourth quarter after taking care of carryover.

On top of their other worries, the mills are under increasing pressure to produce light plate on their sheet mills. They can do this, but every minute of mill space taken away from sheets puts that product farther behind in delivery. But plates are becoming a real concern.

With no letup in sight from industries that have been booming for months, it now looks as though the predicted upturn in railroad car building is getting underway. Some western railroads, including those who did very poorly revenue-wise in 1954, are placing orders for cars.

The pickup in railroad business means there will be increasing pressure on plates, sheets, bars, rails, and other products. The mills will have to find space for their railroad customers, and this means that other consumers of those products will receive less than they had counted on.

SHEETS AND STRIPS . . . From **Detroit** comes word of additional cutbacks. But majority of the mills insist it's nothing to get excited about. Cutbacks are attributed to automakers getting ready for new models. Mills see no letup in sheet orders, claiming that inventories will be built up. Pressure on **Pittsburgh** mills for sheet deliveries is still strong, even though a slight drop in new order volume is reported. Consumer sheet inventories are down and some pickup is noted at the warehouse level. In **Chicago**, mills are beginning to deduct June carryover from July tonnages. Even so, they will still have a 30-day carryover at the end of July. Smaller strip suppliers who had a little 3rd quarter space open 30 days ago are now out of the market. **Cleveland** reports that one producer has put into effect a limited restriction plan by district on cold-rolled sheets. Plan is to try to spread the load. It applies to what there will be left of 4th quarter bookings after taking care of overrun. Automakers have put in bids for same quantity July tonnage as they asked for in June, probably a record month. Some auto plants are down to 5 days' inventory, with most working on 15 days. In the **East**, one producer is through the year on electrogalvanized and silicon sheets.

BARS . . . **West Coast** mills are reported busy keeping up with automotive demand. Auto parts producers who held on to bar orders during the labor talks are getting ready to release orders. In the **East** one producer reports that carbon bars have become so tight that orders for Sept. delivery are no longer being accepted. In **Chicago** there's a 4-5 week carryover on deliveries with stocks reported low at both consumer and warehouse levels. There's heavy consumer pressure to get onto 4th quarter books where mills haven't as yet opened their books.

STRUCTURALS AND SHAPES . . . The construction industry is taking all the structurals **Pittsburgh** mills can produce. Earliest delivery consumers outside construction industry can expect is early next year. Structurals are on 4th quarter quota in **Chicago**. Wide-flange and light structurals are out-of-sight for remainder of the year.

PLATES . . . The already tight plate situation in **Chicago** has mills and consumers facing more trouble as railroad carbuilders step up new construction programs. Plate is now as tight as cold-rolled sheet with no relief in sight. Demand for plate in **Pittsburgh** is hot and getting hotter. With consumer inventories dangerously low, no relief from mills is expected through 3rd quarter. In **Detroit** one mill's brief shutdown for alterations has resulted in an already tight market becoming tighter.

PIPE AND TUBING . . . In the **East** one producer reports that May was the best month in years for all grades and sizes of pipe and tubing. His oil country goods are through Sept. with buttweld now into late July. Oil country seamless pipe in **Pittsburgh** could easily be booked 6 mos. ahead.

WIRE PRODUCTS . . . Solid demand for merchant wire in **Chicago** looks good for balance of the year. One of the biggest bale tie and bale wire years is rapidly shaping up. One producer is installing four additional road mesh welding machines to meet rising demand from stepped up road program. From **Cleveland** comes word that merchant wire deliveries are out to 5-6 weeks with no seasonal slowdown yet seen. Manufacturers wire is out to 2 mos. delivery time. In the **East** demand for rods is on the upswing with delivery averaging 5-6 weeks.

WAREHOUSE . . . Demand in all product lines, including strip, is reported excellent in **Chicago**. June sales may outstrip May as consumer demand continues unabated. Some slump is expected during regular vacation period, but not until July.

COLD EXTRUSION: New applications, new capacity building a bright future ..... p. 51

STEEL: ODM may be set to offer tax incentives for more expansion ..... p. 53

CONSTRUCTION: More Steel going into new homes with all-steel homes coming ..... p. 59

MACHINERY: New, mass-produced screw machine now on market ..... p. 79

Comparison of Prices

(Effective June 21, 1955)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	June 21 1955	June 14 1955	May 24 1955	June 22 1954
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.05¢	4.05¢	4.05¢	3.925¢
Cold-rolled sheets	4.95	4.95	4.95	4.775
Galvanized sheets (10 ga.)	5.45	5.45	5.45	5.275
Hot-rolled strip	4.05	4.05	4.05	3.925
Cold-rolled strip	5.79	5.79	5.79	5.513
Plate	4.225	4.225	4.225	4.10
Plates wrought iron	9.30	9.30	9.30	9.30
Stainl's C-R strip (No. 302)	41.50	41.50	41.50	41.50
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) coke	$9.05	$9.05	$9.05	$8.95
Tinplate, electro (0.50 lb.)	7.75	7.75	7.75	7.65
Special coated mfg. terns	7.85	7.85	7.85	7.75
Bars and Shapes: (per pound)				
Merchant bars	4.30¢	4.30¢	4.30¢	4.16¢
Cold-finished bars	5.40	5.40	5.40	5.22
Alloy bars	5.075	5.075	5.075	4.875
Structural shapes	4.25	4.25	4.25	4.10
Stainless bars (No. 302)	35.50	35.50	35.50	35.50
Wrought iron bars	10.40	10.40	10.40	10.40
Wire: (per pound)				
Bright wire	5.75¢	5.75¢	5.75¢	5.525¢
Rails: (per 100 lb.)				
Heavy rails	$4.45	$4.45	$4.45	$4.325
Light rails	5.35	5.35	5.35	5.20
Semifinished Steel: (per net ton)				
Rerolling billets	$64.00	$64.00	$64.00	$62.00
Slabs, rerolling	64.00	64.00	64.00	62.00
Forging billets	78.00	78.00	78.00	75.50
Alloy blooms, billets, slabs	86.00	86.00	86.00	82.00
Wire Rod and Skelp: (per pound)				
Wire rods	4.675¢	4.675¢	4.675¢	4.525¢
Skelp	3.90	3.90	3.90	3.75
Finished Steel Composite: (per pound)				
Base price	4.797¢	4.797¢	4.797¢	4.634¢

	June 21 1955	June 14 1955	May 24 1955	June 22 1954
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$61.19	$61.19	$61.19	$61.19
Foundry, Valley	56.50	56.50	56.50	56.50
Foundry, Southern, Cin'ti	60.43	60.43	60.43	60.43
Foundry, Birmingham	52.88	52.88	52.88	52.88
Foundry, Chicago	56.50	56.50	56.50	56.50
Basic, del'd Philadelphia	60.27	60.27	60.27	60.27
Basic, Valley furnace	56.00	56.00	56.00	56.00
Malleable, Chicago	56.50	56.50	56.50	56.50
Malleable, Valley	56.50	56.50	56.50	56.50
Ferromanganese‡, cents per lb.	9.50¢	9.50¢	9.50¢	10.00¢
‡ 74-76 pct Mn base.				
Pig Iron Composite: (per gross ton)				
Pig iron	$56.59	$56.59	$56.59	$56.59
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$35.50	$34.50	$34.50	$29.50
No. 1 steel, Phila. area	37.00	35.00	35.00	32.75
No. 1 steel, Chicago	33.50	32.50	32.50	30.50
No. 1 bundles, Detroit	27.00	27.00	27.00	24.50
Low phos., Youngstown	35.50	35.50	35.50	31.50
No. 1 mach'y cast, Pittsburgh	43.50	43.50	43.50	43.50
No. 1 mach'y cast, Philadel'a.	44.50	43.50	44.50	39.50
No. 1 mach'y cast, Chicago	46.50	46.50	45.50	40.50
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	$35.33	$34.00	$34.00	$27.58
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$13.25	$13.25	$13.25	$14.38
Foundry coke, prompt	16.25	16.25	16.25	16.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	36.00	36.00	36.00	30.00
Copper, Lake, Conn.	36.00	36.00	36.00	30.00
Tin, Straits, New York	94.50†	93.50*	91.50	94.125
Zinc, East St. Louis	12.50	12.00	12.00	11.00
Lead, St. Louis	14.80	14.80	14.80	13.80
Aluminum, virgin ingot	23.20	23.20	23.20	21.50
Nickel, electrolytic	67.67	67.67	67.67	63.08
Magnesium, ingot	29.25	29.25	29.25	27.75
Antimony, Laredo, Tex.	28.50	28.50	28.50	28.50

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

←To identify producers, see Key on P. 147→

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem *B3*	$58.00	$58.50	$59.00	$59.50	.....
Birdsboro, Pa. *B6*	58.00	58.50	59.00	59.50	.....
Birmingham *R3*	52.38	52.88	.....	.....	.....
Birmingham *W9*	52.38	52.88	.....	.....	.....
Birmingham *U4*	52.38	52.88	56.50	.....	.....
Buffalo *R3*	56.00	56.50	57.00	.....	.....
Buffalo *H1*	56.00	56.50	57.00	.....	.....
Buffalo *W6*	56.00	56.50	57.00	57.50	.....
Chicago *I4*	56.00	56.50	56.50	57.00	.....
Cleveland *A5*	56.00	56.50	56.50	57.00	61.00
Cleveland *R3*	56.00	56.50	56.50	.....	.....
Daingerfield *L3*	52.50	52.50	52.50	.....	.....
Duluth *I4*	56.00	56.50	56.50	57.00	.....
Erie *I4*	56.00	56.50	56.50	57.00	.....
Everett *M6*	.....	61.00	61.50	.....	.....
Fontana *K1*	62.00	62.50	.....	.....	.....
Geneva, Utah *C7*	56.00	56.50	.....	.....	.....
Granite City *G2*	57.90	58.40	58.90	.....	.....
Hubbard *Y1*	.....	.....	56.50	.....	.....
Minnequa *C6*	56.00	56.00	56.00	.....	.....
Monessen *P6*	56.00	.....	.....	.....	.....
Neville Is. *P4*	56.00	56.50	56.50	.....	.....
N. Tonawanda *T1*	.....	56.50	57.00	.....	.....
Pittsburgh *U1*	56.00	.....	.....	57.00	.....
Sharpsville *S3*	56.00	56.50	56.50	57.00	.....
So. Chicago *R3*	56.00	.....	56.50	.....	.....
Steelton *B3*	58.00	58.50	59.00	59.50	64.00
Swedeland *A2*	58.00	58.50	59.00	59.50	.....
Toledo *I4*	56.00	56.50	56.50	57.00	.....
Troy, N. Y. *R3*	58.00	58.50	59.00	59.50	64.00
Youngstown *Y1*	.....	.....	56.50	57.00	.....

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional, 0.25 pct nickel. Subtract 38¢ per ton for phosphorus content 0.70 and over.

Silvery Iron: Buffalo, *H1*, $66.25; Jackson, *J1, G1*, $65.00. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add $1 per ton for 9.75 pct or more phosphorus. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	301	302	303	304	316	321	347 Cb	410	416	430
Ingots, rerolling	16.75	17.75	19.25	19.00	29.75	23.50	25.50	14.00	—	14.25
Slabs, billets, rerolling	21.00	23.25	25.25	24.50	38.00	30.25	46.75	18.25	—	18.5
Forg. discs, die blocks, rings	39.00	39.00	42.00	41.25	61.75	46.25	—	31.00	31.75	41.7
Billets, forging	30.00	30.25	32.75	31.75	48.25	36.00	54.75	24.00	24.50	24.5
Bars, wires, structurals	35.75	36.00	38.75	38.00	57.25	42.75	64.25	28.75	29.25	29.2
Plates	37.75	38.00	40.25	40.50	60.50	46.50	69.25	30.00	30.50	30.5
Sheets	41.75	42.00	49.25	44.50	64.50	51.25	77.50	34.25	41.25	34.7
Strip, hot-rolled	30.25	32.50	37.25	35.00	55.00	41.75	63.00	26.25	—	27.0
Strip, cold-rolled	38.75	42.00	46.00	44.50	64.50-64.75	51.25-51.50	77.50	34.25	41.25	34.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; McKeesport, Pa., *U1*; Washington, Pa., *W2, J3*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Ft. Wayne, *J4*; Philadelphia, *D5*.

Strip: Midland, Pa., *C11*; Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A3*; Bridgeville, Pa., *U2*; Detroit, *M2*; Canton-Massillon, O., *R3*; Middletown, O., *A7*; Harrison, N. J., *D3*; Youngstown, *C5*; Sharon, Pa., *S1*; Butler, Pa., *A7*; Wallingford, Conn., *U3* (.25¢ per lb higher) *W1* (.25¢ per lb higher); New Bedford, Mass., *R6*.

Bar: Baltimore, *A7*; Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U7*; Washington, Pa., *J3*; McKeesport, Pa., *U1, F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R3*; Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T5*; Ft. Wayne, *I4*; Philadelphia, *D5*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*.

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*.

Plates: Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown, *A7*; Washington, Pa., *J3*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*; Philadelphia, *D5*.

Forged discs, die blocks, rings: Pittsburgh, *C11*; Syracuse, *C11*; Ferndale, Mich., *A3*; Washington, Pa., *J3*.

Forgings billets: Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J3*; McKeesport, *F1*; Massillon, Canton, O., *R3* Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*.

Prices Jump in Tight Market

Supply pinch brings general increases . . . Chicago, Pittsburgh, Philadelphia all show gains . . . Strong rally sends composite up $1.33 to $35.33.

◆ PRESSURE of tight supply finally made itself felt this week as prices advanced in the three biggest scrap centers. Price of No. 1 heavy melting advanced in Chicago, Pittsburgh and Philadelphia.

The market rally, which has been in the making for several weeks, caught brokers off balance. Commitments on old orders were only being met through broker purchases at mill levels or better. With the first wave of new business, mill prices have broken upward.

In the East the supply pinch showed no sign of easing. Dealer intake is off 30 pct and the area was beginning to eye distant sources for much-needed stock.

Another factor that is strengthening the market is maintenance shutdowns of blast furnaces. With no slackening in steel demand and cutbacks in hot metal at hand or imminent, the difference has to be made up in scrap.

Reflecting general strength of a rising market, THE IRON AGE Composite for No. 1 Heavy Melting Steel Scrap rose $1.33 to $35.33.

Pittsburgh . . . Steelmaking grades advanced $1 as the market continues to show added strength. It is mainly a broker's market and the brokers have been caught short trying to fill current orders. The strong competition for the dealer's scrap has placed a premium price on it with scrap piles currently getting smaller. Orders for No. 2 heavy melting are the hardest to fill with No. 1 right behind. As yet, No. 2 bundles are comparatively abundant.

Chicago . . . Broker buying prices continued to advance with nearly all steelmaking grades now moving at what were previously consumer delivered prices, and with price advances occurring in nearly all grades. Railroad is very strong, electric furnace is holding the line but has been bolstered by fresh mill purchases in quantity over the past week. Despite the approaching vacation season, the movement of cast scrap continues very strong. At least part of the dealer pressure is believed to be predicated on the need for stepping up repairs of hot metal facilities in the mills, with a consequent cutback in the amount of hot metal available. It is believed that many mills had expected cutbacks in steel output earlier in the year, which would have allowed for furnace repairs.

Philadelphia . . . The firmer tone of the local market, backed by strong demand from mills and exporters, has pegged the price of No. 1 heavy melting at $37.50 tops, up $2 over last week's list. Price of No. 2 top steelmaking grade and blast furnace grades moved up in sympathy by 50¢. Other grades showing increases at the moment include heavy turnings and No. 1 machinery cast, up $1. Dealers report intake into yards is off 30 pct. In the face of a steadily tightening scrap availability situation, belief is current that new inland sources will have to be tapped to fill orders. Some broker buying is reported as high as $37.00 for No. 1 heavy melting.

New York . . . On the basis of general buying, prices of steelmaking and blast furnace grades rose $1 on the average. Tightness of scrap had made increases simply a matter of new orders confirming an existing situation. Brokers have been having trouble covering old orders at previous levels. New business has started the market up.

Detroit . . . The market was definitely firmer here this week. There is still no activity and dealers say they have never seen things more quiet. Brokers feel that prices on July auto lists will be up about 75¢, but there is nothing to back up the opinion. Mills still have huge scrap inventories and auto production is still at record levels. No price changes.

Cleveland . . . Foundry grades went up $1 last week as foundrymen rushed work before vacation shut down. Some brokers are having difficulty finding good quality scrap and in some cases are unable to take orders. Foundry inventories are generally low due to lack of storage space. Many foundries are cancelling shutdowns in favor of staggered vacations due to upsurge of business. Dealers bullish on steelmaking scrap in Cleveland and Valley but no major recent sale.

Birmingham . . . Both the domestic and export scrap market in this area continue dull, with little active buying either by steel mills or foundries. An Atlanta mill was in the market for limited tonnages but the largest buyer in the district still held up shipments. With good inventories and vacations at hand the cast market continued steady on small quantity purchases to keep inventories level.

St. Louis . . . Steel operating rate continues at the high point of 106.1 pct and the receipts of scrap are equal to the melt. Railroad lists closing during the week included 30 carloads by the St. Louis-San Francisco and 125 carloads by Mopac. Bidding for this may affect prices, which are now unchanged.

Cincinnati . . . One large area consumer expected to increase buying next month but no major sale this week. Foundry buying increasingly strong but no major price increases. Considerable steelmaking scrap barged to Pittsburgh. Approaching vacation shutdown of one area mill may dampen steel scrap market.

Buffalo . . . Price held firm in the quiet Buffalo market. Steel operations continue unchanged. There have been no new demands on the scrap supply.

Boston . . . The dull Boston market came to life last week. A large local mill bought steelmaking grades. Prices of most items moved upward. Eastern Pennsylvania mills have started buying more. Pittsburgh mills are fairly active. Export remains quiet.

West Coast . . . Some mills fear prices may go up if heavy exporting continues into July and August. One mill admits it's eating into inventories and another just isn't buying.

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For over half a century our experience, personnel, equipment and key office locations have contributed to the steady growth of the iron and steel industry. Possibly our facilities may help you solve a problem in iron or steel scrap—no matter how big or small.

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Scrap Prices *(Effective June 21, 1955)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 bundles	35.00 to 36.00
No. 2 bundles	27.00 to 28.00
Machine shop turn.	20.50 to 21.50
Mixed bor. and ms. turns.	20.50 to 21.50
Shoveling turnings	24.50 to 25.50
Cast iron borings	24.50 to 25.50
Low phos. punch'gs, plate	38.00 to 39.00
Heavy turnings	33.00 to 33.00
No. 1 RR. hvy. melting	36.50 to 37.50
Scrap rails, random lgth.	44.00 to 45.00
Rails 2 ft and under	50.00 to 51.00
RR. steel wheels	43.00 to 44.00
RR. spring steel	43.00 to 44.00
RR. couplers and knuckles	43.00 to 44.00
No. 1 machinery cast.	43.00 to 44.00
Cupola cast.	39.00 to 40.00
Heavy breakable cast.	34.00 to 35.00

Chicago

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 factory bundles	36.00 to 37.00
No. 1 dealers' bundles	33.00 to 34.00
No. 2 dealers' bundles	24.00 to 25.00
Machine shop turn.	17.00 to 18.50
Mixed bor. and turn.	20.00 to 21.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	20.00 to 21.00
Low phos. forge crops	39.00 to 40.00
Low phos. punch'gs, plate	37.00 to 38.00
Low phos. 2 ft and under	36.00 to 37.00
No. 1 RR. hvy. melting	37.00 to 38.00
Scrap rails, random lgth.	44.00 to 45.00
Rerolling rails	52.00 to 53.00
Rails 2 ft and under	49.00 to 50.00
Locomotive tires, cut	36.00 to 37.00
Cut bolsters & side frames	38.00 to 39.00
Angles and splice bars	45.00 to 46.00
RR. steel car axles	43.00 to 44.00
RR. couplers and knuckles	42.00 to 43.00
No. 1 machinery cast.	46.00 to 47.00
Cupola cast.	42.00 to 43.00
Heavy breakable cast.	32.50 to 33.50
Cast iron brake shoes	33.00 to 34.00
Cast iron car wheels	37.00 to 38.00
Malleable	45.00 to 46.00
Stove plate	33.00 to 34.00

Philadelphia Area

No. 1 hvy. melting	$36.50 to $37.50
No. 2 hvy. melting	32.00 to 33.00
No. 1 bundles	36.50 to 37.50
No. 2 bundles	27.00 to 28.00
Machine shop turn.	21.00 to 22.00
Mixed bor. short turn.	21.00 to 22.00
Cast iron borings	21.00 to 22.00
Shoveling turnings	24.00 to 25.00
Clean cast chem. borings	27.00 to 28.00
Low phos. 5 ft and under	38.50 to 39.50
Low phos. 2 ft and under	40.00 to 41.00
Low phos. punch'gs	40.00 to 41.00
Elec. furnace bundles	37.50 to 38.50
Heavy turnings	33.00 to 34.00
RR. steel wheels	40.00 to 41.00
RR. spring steel	40.00 to 41.00
Rails 18 in. and under	50.00 to 51.00
Cupola cast.	35.00 to 36.00
Heavy breakable cast.	40.00 to 41.00
Cast iron car wheels	45.00 to 46.00
Malleable	44.00 to 45.00
Unstripped motor blocks	27.00 to 28.00
No. 1 machinery cast.	44.00 to 45.00
Charging box cast.	37.00 to 38.00

Cleveland

No. 1 hvy. melting	$33.00 to $33.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 bundles	32.00 to 33.00
No. 2 bundles	23.00 to 24.00
No. 1 busheling	32.00 to 33.00
Machine shop turn.	17.00 to 18.00
Mixed bor. and turn.	22.00 to 23.00
Shoveling turnings	22.00 to 23.00
Cast iron borings	22.00 to 23.00
Cut struct'r'l & plates, 2 ft & under	40.00 to 41.00
Drop forge flashings	32.00 to 33.00
Low phos. punch'gs, plate	32.50 to 33.50
Foundry steel, 2 ft & under	32.50 to 33.50
No. 1 RR. heavy melting	35.00 to 36.00
Rails 2 ft and under	48.00 to 49.00
Rails 18 in. and under	49.00 to 50.00
Railroad grate bars	26.00 to 27.00
Steel axle turnings	26.00 to 27.00
Railroad cast.	45.00 to 46.00
No. 1 machinery cast.	45.00 to 46.00
Stove plate	44.00 to 45.00
Malleable	45.00 to 46.00

Youngstown

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 bundles	34.00 to 35.00
No. 2 bundles	25.00 to 26.00
Machine shop turn.	18.50 to 19.50
Shoveling turnings	24.50 to 25.50
Cast iron borings	24.50 to 25.50
Low phos. plate	35.00 to 36.00

Buffalo

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	24.50 to 25.50
No. 1 busheling	29.00 to 30.00
No. 1 bundles	29.00 to 30.00
No. 2 bundles	22.50 to 23.50
Machine shop turn.	18.00 to 19.00
Mixed bor. and turn.	20.50 to 21.50
Shoveling turnings	21.50 to 22.50
Cast iron borings	20.50 to 21.50
Low phos. plate	32.00 to 33.00
Scrap rails, random lgth.	35.00 to 36.00
Rails 2 ft and under	42.00 to 43.00
RR. steel wheels	36.00 to 37.00
RR. spring steel	36.00 to 37.00
RR. couplers and knuckles	36.00 to 37.00
No. 1 machinery cast.	40.00 to 41.00
No. 1 cupola cast.	36.00 to 37.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$26.50 to $27.50
No. 2 hvy. melting	21.00 to 22.00
No. 1 bundles, openhearth	26.50 to 27.50
No. 2 bundles	17.50 to 18.50
New busheling	26.50 to 27.50
Drop forge flashings	26.00 to 27.00
Machine shop turn.	12.00 to 13.00
Mixed bor. and turn.	14.50 to 15.50
Shoveling turnings	15.50 to 16.50
Cast iron borings	15.50 to 16.50
Low phos. punch'gs, plate	27.50 to 28.50
No. 1 cupola cast.	35.00 to 37.00
Heavy breakable cast.	27.00 to 28.00
Stove plate	31.00 to 32.00
Automotive cast.	40.00 to 41.00

St. Louis

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 bundles	30.00 to 31.00
No. 2 bundles	23.50 to 24.50
Machine shop turn.	15.50 to 16.50
Cast iron borings	17.50 to 18.50
Shoveling turnings	17.50 to 18.50
No. 1 RR. hvy. melting	35.00 to 36.00
Rails, random lengths	39.00 to 40.00
Rails, 18 in. and under	47.00 to 48.00
Locomotive tires uncut	36.50 to 37.50
Angles and splice bars	36.50 to 37.50
Std. steel car axles	36.00 to 37.00
RR. spring steel	37.00 to 38.00
Cupola cast.	42.00 to 43.00
Hvy. breakable cast.	34.00 to 35.00
Cast iron brake shoes	32.00 to 33.00
Stove plate	35.00 to 36.00
Cast iron car wheels	35.00 to 36.00
Malleable	35.00 to 36.00
Unstripped motor blocks	33.50 to 34.50

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$28.00 to $29.00
No. 2 hvy. melting	21.50 to 22.50
No. 1 bundles	28.00 to 29.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	28.00 to 29.00
Elec. furnace, 2 ft & under	32.00 to 33.00
Machine shop turn.	12.50 to 13.00
Mixed bor. and short turn.	15.00 to 15.50
Shoveling turnings	16.25 to 16.75
Clean cast chem. borings	17.00 to 18.00
No. 1 machinery cast.	30.00 to 31.00
Mixed cupola cast.	28.00 to 29.00
Heavy breakable cast.	29.00 to 30.00
Stove plate	28.00 to 29.00
Unstripped motor blocks	17.00 to 18.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$31.50
No. 2 hvy. melting	27.50
No. 2 bundles	$23.00 to 23.50
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	14.00 to 15.00
Shoveling turnings	15.00 to 16.00
Clean cast chem. borings	21.00 to 22.00
No. 1 machinery cast.	35.00 to 37.00
Mixed yard cast.	31.00 to 32.00
Charging box cast.	32.00 to 34.00
Heavy breakable cast.	33.00 to 34.00
Unstripped motor blocks	22.00 to 23.00

Birmingham

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 bundles	29.00 to 30.00
No. 2 bundles	18.00 to 19.00
No. 1 busheling	29.00 to 30.00
Machine shop turn.	18.00 to 19.00
Shoveling turnings	24.00 to 25.00
Cast iron borings	15.00 to 16.00
Electric furnace bundles	31.00 to 32.00
Bar crops and plate	36.00 to 37.00
Structural and plate, 2 ft	36.00 to 37.00
No. 1 RR. hvy. melting	35.00 to 36.00
Scrap rails, random lgth.	40.00 to 41.00
Rails, 18 in. and under	45.00 to 46.00
Angles & splice bars	43.00 to 44.00
Shoveling turnings	24.00 to 25.00
No. 1 cupola cast.	45.00 to 46.00
Stove plate	42.00 to 43.00
Charging box cast.	22.00 to 23.00
Cast iron car wheels	33.00 to 34.00
Unstripped motor blocks	34.50 to 35.50
Mashed tin cans	15.00 to 16.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$30.50 to $31.50
No. 2 hvy. melting	27.50 to 28.50
No. 1 bundles	31.50 to 32.50
No. 2 bundles	21.50 to 22.50
Machine shop turn.	18.00 to 19.00
Mixed bor. and turn.	17.50 to 18.50
Shoveling turnings	22.00 to 23.00
Cast iron borings	17.50 to 18.50
Low phos., 18 in. & under	37.00 to 38.00
Rails, random lengths	41.00 to 42.00
Rails, 18 in. and under	47.00 to 48.00
No. 1 cupola cast.	40.00 to 41.00
Hvy. breakable cast.	34.00 to 35.00
Drop broken cast.	44.00 to 45.00

San Francisco

No. 1 hvy. melting	$30.00
No. 2 hvy. melting	28.00
No. 1 bundles	29.00
No. 2 bundles	25.00
No. 3 bundles	21.00
Machine shop turn.	10.00
Cast iron borings	9.00
No. 1 RR. hvy. melting	30.00
No. 1 cupola cast.	40.00

Los Angeles

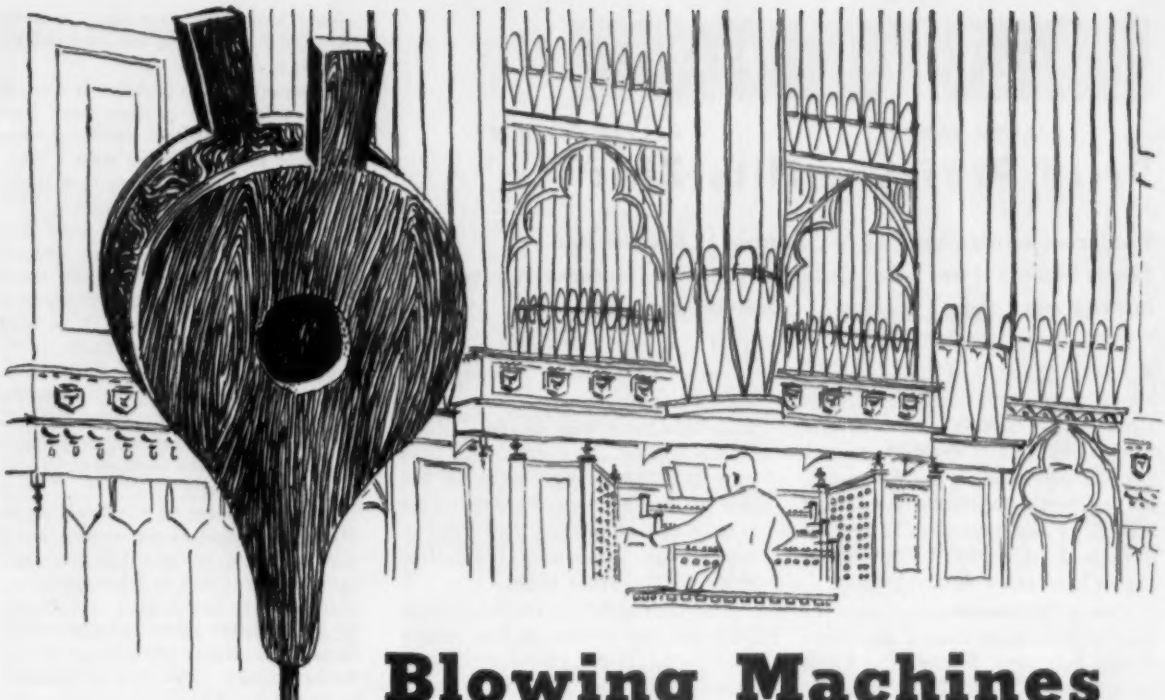
No. 1 hvy. melting	$30.00
No. 2 hvy. melting	28.00
No. 1 bundles	29.00
No. 2 bundles	23.00
No. 3 bundles	20.00
Machine shop turn.	8.00
Shoveling turnings	10.00
Cast iron borings	10.00
Elec. furn. 1 ft. and under	30.00
No. 1 RR. hvy. melting	30.00
No. 1 cupola cast.	$41.00 to 42.00

Seattle

No. 1 hvy. melting	$33.00
No. 2 hvy. melting	29.00
No. 2 bundles	23.00
No. 3 bundles	19.00
No. 1 cupola cast.	35.00
Mixed yard cast.	35.00

Hamilton, Ont.

No. 1 hvy. melting	$34.00
No. 2 hvy. melting	31.00
No. 1 bundles	34.00
No. 2 bundles	28.00
Mixed steel scrap	28.00
Bushelings	29.00
Bush., new fact prep'd	32.00
Bush., new fact unprep'd	28.00
Machine shop turn.	16.00
Short steel turnings	21.00
Mixed bor. and turn.	$16.00 to 17.00
Rails, rerolling	43.00
Cast scrap	42.00 to 45.00



Blowing Machines

One of the oldest, simplest and most common of blowing machines is the bellows, used by workers in metals since time immemorial. But about 1550, one Hans Lobsinger, an organist at Nuremberg, invented a wooden bellows for use in blast furnaces.

Today, bellows of wood have given way to "blowing machines" of steel, and to purposes not confined to the church, the forge, or even the blast furnace. Their uses have been multiplied for innumerable tasks on the farm, in the home, for industry, transportation, and the military.

To provide continuous production for the ever increasing uses of steel products, an unfailing supply of scrap is needed daily.

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Price Pressure Hits Zinc

Producers up zinc ½¢ per lb . . . Now 12.50¢ per lb, this is highest it has been since early '53 . . . Increase is second in little more than 2 months . . . Demand drops off.

◆ ZINC HAS had another go-round on the inflation wheel. After threatening to do so for several weeks, zinc finally cracked through the 12¢-per-lb price line last week, as producers upped the metal half a cent. Price is now at 12.50¢ per lb f.o.b., East St. Louis, the highest it has been since January 1953.

This is the second price jump for zinc in little more than 2 months—it was only Apr. 5 when the metal moved from 11.50¢ to 12.00¢ per lb.

Pressure on zinc prices, which has caused the metal to jump 3.25¢ since January 1954, is partially government sponsored as a result of stockpiling. Mainly to make certain that the U. S. has sufficient zinc production facilities in event of war, the government added zinc to its stockpile list.

This was of considerable aid to producers, particularly when their stocks were high and prices low. Since last July, for example, the government's stockpile take has averaged around 15,000 tons per month, although in the last few months producers have been giving the government less metal because their stocks are down and demand continues strong.

Evidence of the marked improvement in zinc so far as producers are concerned shows up in figures covering their unsold stocks. At the end of May last year, stocks of all grades of zinc in producers' hands amounted to 209,828 tons; figure at the end of May this year was 63,184.

Stockpiling, of course, has been only a contributing factor in the change in the zinc market. Like copper and aluminum, zinc too has been under pressures that stem from our business boom.

The tremendous auto production pace has put strain on the supply of Special High grade zinc, and brass mills and steel mills have been placing heavy orders for zinc ever since their production rates began to soar.

Immediate market reaction to the half-cent-per-lb price increase was a lessening of demand. Some consumers had attempted to hike their zinc take in anticipation of the price increase, but producers, also anticipating higher prices, were not overly anxious to book orders. At any rate, the easing of demand that was apparent late last week should not last very long.

ALUMINUM . . . Pressing need for aluminum has forced the government to divert 100,000 tons of aluminum originally slated for delivery to the stockpile in the third quarter. Simultaneously, the government extended until Oct. 31 the deadline for delivery of aluminum that was previously to have been added to the stockpile by Aug. 31.

Defense officials are still thrashing out the problem of whether or not a government-assisted third round aluminum expansion program is needed. Verdict is expected within a month.

However, if the decision is delayed much longer, the problem may have solved itself, because the aluminum industry is going ahead with a number of expansion projects that would build up capacity considerably.

Late last week Kaiser confirmed that it is seeking a fast tax writeoff on a $115 million project that would increase its aluminum production capacity by 90,000 tons. Plan also covers construction of facilities to produce an additional 480,000 tons of alumina per year. This would be more than enough to meet Kaiser's production needs and can only mean the company plans even more expansion in the future.

A little earlier in the week, Olin-Mathieson received an extension of its certificate of necessity for construction of a $75 million aluminum plant which would have a capacity of 60,000 tons. Other aluminum expansion programs planned or in the works: Alcoa is increasing its capacity by 65,000 tons, Reynolds is upping its output potential by at least 25,000 tons, and St. Joseph Lead Company and Pittsburgh Consolidation Coal Co. have applied for a certificate of necessity on an $85 million plant with a capacity of 65,000 tons. And of course Anaconda's new plant is coming in soon with its new facilities which have a capacity of around 60,000 tons.

NICKEL . . . Industry's stocks of nickel are at their lowest level since the peak of the Korean War in 1952. To help ease the shortage the government is making available to industry 4 million lb of nickel scheduled for delivery to the stockpile in the third quarter. Two million lb is to be made available in July and 1 million lb in both August and September.

MAGNESIUM . . . Outlook for magnesium castings is that they will do just about as well as last year. Shipment figures for the year will probably closely approximate '54 totals, unless there is a step up in orders reflecting increased aircraft production.

Magnesium Assn. statistics show shipments of magnesium castings in April totaled 1316 tons, up 2.3 pct from March.

COPPER . . . Labor dominated the copper news as negotiations on a new contract were in progress. Strike votes were scheduled this week at Anaconda, American Smelting & Refining, Phelps-Dodge and Kennecott Copper. Market continues strong.

Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	June 15	June 16	June 17	June 18	June 20	June 21
Copper, electro, Conn.	36.00	36.00	36.00	36.00	36.00	36.00
Copper, Lake, delivered	36.00	36.00	36.00	36.00	36.00	36.00
Tin, Straits, New York	93.75	94.375	94.371	....	94.50	94.50*
Zinc, East St. Louis	12.00	12.50	12.50	12.50	12.50	12.50
Lead, St. Louis	14.80	14.80	14.80	14.80	14.80	14.80

Note: Quotations are going prices **Tentative*

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Alloy	Flat Sheet			Plate
	0.032 in.	0.081 in.	0.136-0.249 in.	0.250-3.000 in.
1100, 3003	39.1	37.1	35.9	35.5
3004	44.0	39.8	38.1	37.6
5052	46.7	41.9	40.2	39.3
2024-O, -OAL	49.4	40.8	39.3	39.4
7075-O, -OAL	60.8	49.1	46.8	46.8

Extruded Solid Shapes: Shape factors 1 to 6, 38.7¢ to 86.7¢; 12 to 14, 39.4¢ to $1.04; 24 to 26, 42.2¢ to $1.35; 36 to 38, 49.8¢ to $1.97.

Rod, Round: Rolled, 1.064-4-5 in., 1100-F, 48.6¢ to 40.1¢; cold finished, 0.375-3.499 in., 1100-F, 47.9¢ to 42.4¢.

Screw Machine Stock: Rounds, 2011-T3, ⅛-11/32 in., 63.5¢ to 50.1¢; ⅝-1½ in., 49.9¢ to 46.9¢; 1 9/16-3 in., 45.7¢ to 42.7¢. Base 5000 lb.

Drawn Wire: Coiled, 0.051-0.374 in., 1100, 47.1¢ to 35.8¢; 5052, 56.7¢ to 44.4¢; 2017-T4, 54.3¢ to 44.7¢; 6061-T4, 59.5¢ to 44.1¢.

Extruded Tubing: Rounds, 6063-T5, OD 1¼-2 in., 44.4¢ to 64.8¢; 2-4 in., 40.3¢ to 54.6¢; 4-6 in., 40.8¢ to 49.8¢; 6-9 in., 41.4¢ to 52.1¢.

Roofing sheet: Flat, per sheet, 0.032-in., 42¾ x 60-in., $2.998; x 96-in., $4.801; x 120-in., $6.002; x 144-in., $7.202. Coiled sheet, per lb, 0.019 in. x 28 in., 30.9¢.

Magnesium

(F.o.b. mill, freight allowed)

Sheet & Plate: FS1-O ¼ in., 59¢; 3/16 in., 60¢; ½ in., 59¢; 0.064 in., 76¢; 0.032 in., 97¢. Specification grade higher. Base, 30,000 lb.

Extruded Round Rod: M, diam ¼ to 0.311 in., 79¢; ⅜ to ¾ in., 62.5¢; 1¼ to 1.749 in., 59¢; 2½ to 5 in., 54.5¢. Other alloys higher. Base up to ¾ in. diam, 10,000 lb; ⅞ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes: Rectangles: M. In weight per ft for perimeters less than size indicated: 0.10 to 0.11 lb, 3.5 in., 67.3¢; 0.22 to 0.25 lb, 5.9 in., 64.3¢; 0.50 to 0.59 lb, 8.6 in., 61.7¢; 1.5 to 2.59 lb, 19.5 in., 59.8¢; 4 to 6 lb, 28 in., 55¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, 0.049 to 0.057 in. wall thickness: OD ¾ to 5/16 in., $1.46; 5/16 to ⅝ in., $1.32; ½ to ⅝ in., 99¢; 1 to 2 in., 82¢; 0.165 to 0.219 in. wall: OD, ⅝ to ¾ in., 67¢; 1 to 2 in., 63¢; 3 to 4 in., 62¢. Other alloys higher. Base OD: Up to 1½ in., 10,000 lb; 1½ to 3 in., 20,000 lb; over 3 in., 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, $14.00-$14.50; alloy $16.50; Plate, HR, commercially pure, $11.50-$12.00; alloy, $12.50-$12.75; Wire, rolled and/or drawn, commercially pure, $10.50-$11.00; alloy, $12.50; Bar, HR or forged, commercially pure, $8.50-$8.75; alloy, $8.50-$9.00.

Nickel, Monel, Inconel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	102	78	99
Strip, CR	102	87	125
Rod, Bar, HR	87	69	93
Angles, HR	87	69	93
Plate, HR	97	82	95
Seamless Tube	122	108	153
Shot, Blocks		85	

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Extruded Shapes
Copper	52.79		54.86
Copper, h-r	54.76	51.11	
Copper, drawn		52.36	
Low brass	49.75	49.69	
Yellow brass	46.27	46.21	
Red brass	50.99	50.93	
Naval brass		44.30	45.56
Leaded brass			43.09
Com. bronze	52.78	52.72	
Mang. bronze	53.73	47.83	49.39
Phos. bronze	73.03	72.53	
Muntz metal	48.14	43.95	45.20
Ni silver, 10 pct	60.20	63.28	66.34

Beryllium copper, CR, 1.9% Be, Base 2000 lb, f.o.b.

Strip	$1.74
Rod, bar, wire	1.71

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	23.20
Aluminum pig	21.50
Antimony, American, Laredo, Tex.	28.50
Beryllium copper, per lb conta'd Be	$40.00
Beryllium aluminum 5% Be, Dollars per lb contained Be	$72.75
Bismuth, ton lots	$2.25
Cadmium, del'd	$1.70
Cobalt, 97-99% (per lb)	$2.60 to $2.67
Copper, electro, Conn. Valley	36.00
Copper, Lake, delivered	36.00
Gold, U. S. Treas., per troy oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$90 to $100
Lead, St. Louis	14.80
Lead, New York	15.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb, pig	28.50
ingot	29.25
Magnesium, sticks, 100 to 500 lb	49.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$284 to $286
Nickel electro, f.o.b. N. Y. warehouse	67.67
Nickel oxide sinter, at Copper Cliff, Ont., contained nickel	60.75
Palladium, dollars per troy oz.	$20 to $21
Platinum, dollars per troy oz.	$77 to $80
Silver, New York, cents per troy oz.	89.25
Tin, New York	94.50
Titanium, sponge, grade A-1	$3.95
Zinc, East St. Louis	12.50
Zinc, New York	13.00
Zirconium, sponge	$10.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot	
No. 115	34.50
No. 120	33.75
No. 123	33.25
80-10-10 ingot	
No. 305	38.00
No. 315	36.25
88-10-2 ingot	
No. 210	47.25
No. 215	43.75
No. 245	39.75
Yellow ingot	
No. 405	29.25
Manganese bronze	
No. 421	31.75

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper, max.	27.50-28.25
0.60 copper, max.	27.25-28.00
Piston alloys (No. 122 type)	26.50-28.50
No. 12 alum. (No. 2 grade)	26.00-26.50
108 alloy	26.00-26.50
195 alloy	27.00-28.00
13 alloy (0.60 copper max.)	27.75-28.00
ASX-679	26.00-26.50

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97½%	26.00-27.00
Grade 2—92-95%	25.00-26.00
Grade 3—90-92%	24.50-25.00
Grade 4—85-90%	23.50-24.50

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 5000 lb lots)

Copper	
Cast, oval, 15 in. or longer	44.92
Electrodeposited	39.78
Flat rolled	45.42
Brass, 80-20	
Cast, oval, 15 in. or longer	43.515
Zinc, flat cast	20.25
Ball, anodes	18.50
Nickel, 99 pct plus	
Cast	90.50*
Cadmium	$1.70
Silver 999 fine, rolled, 100 oz. lots per troy oz., f.o.b. Bridgeport, Conn.	94½

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	63.00
Copper sulphate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	31.25*
Nickel chloride, 300 to 400 lb.	43.50*
Silver cyanide, 100 oz. lots, per oz.	75½
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drum	54.30

* Effective Jan. 3.

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	32	31¼
Yellow brass	23⅞	22
Red brass	28⅛	27⅝
Comm. bronze	29¼	28½
Mang. bronze	22 1/6	21⅝
Yellow brass rod ends	23⅝	22

Custom Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	34¾
No. 2 copper wire	34¼
Light copper	32⅛
*Refinery brass	31⅛

* Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	35¼
No. 2 copper wire	33¾
Light copper	32
No. 1 composition	28
No. 1 comp. turnings	28
Rolled brass	20½—21
Brass pipe	19½—20
Radiators	21½—21¾
Aluminum	
Mixed old cast	15 —16½
Mixed new clips	17 —18
Mixed turnings, dry	15½—17

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	33 —33½
No. 2 heavy copper and wire	31½—32
Light copper	29½—30
New type shell cuttings	29½—30
Auto radiators (unsweated)	18 —18½
No. 1 composition	24¾—25¼
No. 1 composition turnings	24¼—24¾
Unlined red car boxes	18½—19
Cocks and faucets	19½—20
Mixed heavy yellow brass	16½—17
Old rolled brass	18 —18½
Brass pipe	19½—20
New soft brass clippings	21½—22
Brass rod ends	20½—21
No. 1 brass rod turnings	19½—20

Aluminum

Alum. pistons and struts	12 —12½
Aluminum crankcases	13 —13½
1100 (2S) aluminum clippings	15 —15½
Old sheet and utensils	12 —12½
Borings and turnings	8½— 9
Misc. cast aluminum	12 —12½
2024 (24s) clippings	14 —14½

Zinc

New zinc clippings	7 — 7½
Old zinc	5 — 5¼
Zinc routings	3½— 3¾
Old die cast scrap	3½— 3¾

Nickel and Monel

Pure nickel clippings	75
Clean nickel turnings	60
Nickel anodes	75
Nickel rod ends	75
New Monel clippings	37 —38
Clean Monel turnings	27½
Old sheet Monel	32 —33
Nickel silver clippings, mixed	18½—19
Nickel silver turnings, mixed	16½—17

Lead

Soft scrap lead	11½—12
Battery plates (dry)	6 — 6¼
Batteries, acid free	4¼

Magnesium

Segregated solids	18½—19
Castings	17½—18

Miscellaneous

Block tin	75
No. 1 pewter	58 —59
No. 1 auto babbitt	48
Mixed common babbitt	14
Solder joints	17 —17⅛
Siphon tops	40
Small foundry type	15½—16
Monotype	14½—15
Lino. and stereotype	14 —14½
Electrotype	12 —12¼
Hand picked type shells	10¾
Lino. and stereo. dross	4¾— 5
Electro dross	3½— 4

IRON AGE

STEEL PRICES

(Effective June 11, 1956)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$86.00 *B3*		4.30 *B3*	6.45 *B3*	4.30 *B3*						
	Buffalo, N. Y.	$64.00 *B3*	$78.00 *B3, R3*	$86.00 *B3, R3*	5.075 *B3*	4.30 *B3*	6.45 *B3*	4.30 *B3*	4.05 *B3,R3*	5.75 *R7,S10*	6.15 *B3*	8.425 *B3*		
	Claymont, Del.													
	Harrison, N. J.													12.45 *C11*
	Conshohocken, Pa.								4.10 *A2*	5.80 *A2*	6.15 *A2*			
	New Bedford, Mass.									6.20 *R6*				
	Johnstown, Pa.	$64.00 *B3*	$78.00 *B3*	$86.00 *B3*		4.30 *B3*	6.45 *B3*		4.05 *B3*					
	Boston, Mass.									6.30 *T8*				12.80 *T8*
	New Haven, Conn.									6.20 *D1* 6.50 *A5*				
	Phoenixville, Pa.					4.20 *P2*		4.30 *P2*						
	Sparrows Pt., Md.								4.05 *B3*	5.75 *B3, T8*	6.15 *B3*	8.425 *B3*		
	Bridgeport, Wallingford, Conn.	$69.00 *N8*	$83.00 *N8*						4.35 *N8*	6.20 *W1*			7.00 *N8*	
	Pawtucket, R. I. Worcester, Mass.									6.30 *N7* 6.60 *A5*				12.75 *A5* 12.80 *N7*
MIDDLE WEST	Alton, Ill.								4.225 *L1*					
	Ashland, Ky.								4.05 *A7*					
	Canton-Massillon, Dover, Ohio		$80.00 *R3*	$86.00 *R3, T5*										12.45 *G4*
	Chicago, Ill.	$64.00 *U1*	$78.00 *R3, U1,W8*	$86.00 *U1, W8,R3*	5.075 *U1*	4.25 *U1, W8*	6.40 *U1, Y1*	4.25 *U1*	4.05 *A1,N4, W8*	5.85 *A1,T8*				12.45 *T8*
	Cleveland, Ohio									5.75 *A5,J3*		8.60 *A5*		12.45 *A5*
	Detroit, Mich.			$86.00 *R5*					4.15 *G3,M2*	5.85 *D1,D2, G3,M2,P11*	6.25 *G3*	8.70 *D2, G3*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$64.00 *U1*	$78.00 *U1*	$86.00 *U1, Y1*	5.075 *I3*	4.25 *I3, U1*	6.40 *U1, I3*		4.05 *I3, U1,Y1*	5.85 *I3*	6.15 *U1, I3,Y1*	8.60 *Y1*	6.70 *U1, Y1*	
	Sterling, Ill.								4.15 *N4*					
	Indianapolis, Ind.									5.90 *C5*				
	Newport, Ky.												6.70 *Y5*	
	Middletown, Ohio									5.75 *A7*				
	Niles, Warren, Ohio Sharon, Pa.								4.05 *S1,R3*	5.75 *S1,R3, T4*	6.15 *S1, R3*	8.60 *S1, R3*	6.70 *S1*	12.45 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$64.00 *U1, J3*	$78.00 *J3, U1,C11*	$86.00 *U1, C11*	5.075 *U1*	4.25 *J3, U1*	6.40 *J3, U1*	4.25 *U1*	4.05 *P6*	5.75 *B4,J3, S7*			6.70 *S9*	12.45 *S9*
	Portsmouth, Ohio								4.05 *P7*	5.75 *P7*				
	Weirton, Wheeling, Follansbee, W. Va.					4.25 *W3*			4.05 *W3*	5.75 *F3,W3*	6.15 *W3*	8.60 *W3*		
	Youngstown, Ohio		$78.00 *C10*	$86.00 *Y1, C10*		4.25 *Y1*	6.40 *Y1*		4.05 *U1,Y1*	5.75 *Y1,C5*	6.15 *U1, Y1*	8.60 *Y1*	6.70 *U1, Y1*	12.45 *C5*
WEST	Fontana, Cal.	$72.00 *K1*	$86.00 *K1*	$105.00 *K1*		4.90 *K1*	7.05 *K1*	5.25 *K1*	4.825 *K1*	7.50 *K1*	7.25 *K1*		8.10 *K1*	14.55 *K1*
	Geneva, Utah		$78.00 *C7*			4.25 *C7*	6.40 *C7*							
	Kansas City, Mo.					4.30 *S2*	6.45 *S2*				6.40 *S2*		6.95 *S2*	
	Los Angeles, Torrance, Cal.		$87.50 *B2*	$105.00 *B2*		4.95 *B2, C7*	7.10 *B2*		4.80 *B2,C7*	7.80 *C1*				
	Minnequa, Colo.					4.70 *C6*			5.15 *C6*					
	Portland, Ore.					5.00 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$87.50 *B2*			4.90 *B2* 4.95 *P9*	7.05 *B2*		4.80 *B2,C7*					
	Seattle, Wash.		$91.50 *B2*			5.00 *B2*	7.15 *B2*		5.05 *B2, P12*					
SOUTH	Atlanta, Ga.								4.25 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$64.00 *T2*	$78.00 *T2*			4.25 *C16, R3,T2*	6.40 *T2*		4.05 *R3, T2,C16*		6.15 *T2*			
	Houston, Lone Star, Tex.	$70.00 *L3*	$83.00 *S2*	$91.00 *S2*		4.30 *S2*	6.45 *S2*				6.40 *S2*		6.95 *S2*	

IRON AGE

STEEL PRICES

(Effective June 21, 1955)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled 18 ga. hvyr.	Cold-rolled	Galvanized 10 ga.	Enameling 12 ga.	Long Terne 10 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled 19 ga.		Cokes* 1.25-lb. base box	Electro* 0.25-lb. base box	Hollowware Enameling 29 ga.
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.05 *B3*	4.95 *B3*				6.10 *B3*	7.50 *B3*			4.675 *W6*	† Special coated mfg. terne deduct 95¢ from 1.25-lb coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25-lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.10. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.													
	Conshohocken, Pa.	4.10 *A2*	5.00 *A2*				6.15 *A2*							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										4.675 *B3*			
	Fairless, Pa.	4.10 *U1*	5.00 *U1*				6.15 *U1*	7.55 *U1*				$8.90 *U1*	$7.60 *U1*	
	New Haven, Conn.													
	Phoenixville, Pa.													
	Sparrows Pt., Md.	4.05 *B3*	4.95 *B3*	5.45 *B3*			6.10 *B3*	7.50 *B3*	8.20 *B3*		4.775 *B3*	$8.90 *B3*	$7.60 *B3*	
	Worcester, Mass.										4.975 *A5*			
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										4.85 *L1*			
	Ashland, Ky.	4.05 *A7*		5.45 *A7*	5.375 *A7*									
	Canton-Massillon, Dover, Ohio			5.45 *R1, R3*						5.175 *R1*				
	Chicago, Joliet, Ill.	4.05 *A1, W8*					6.10 *U1*				4.675 *A5, N4, R3*			
	Sterling, Ill.										4.775 *N4*			
	Cleveland, Ohio	4.05 *J3, R3*	4.95 *J3, R3*		5.375 *R3*		6.10 *J3, R3*	7.50 *J3, R3*			4.675 *A5*			
	Detroit, Mich.	4.15 *G3, M2*	5.05 *G3*				6.20 *G3*	7.60 *G3*						
	Newport, Ky.	4.05 *N5*	4.95 *N5*	5.45 *N5*										
	Gary, Ind. Harbor, Indiana	4.05 *I3, U1, Y1*	4.95 *I3, U1, Y1*	5.45 *U1, I3*	5.375 *I3, U1*	5.85 *U1*	6.10 *U1, I3, Y1*	7.50 *U1, Y1*			4.675 *Y1*	$8.90 *I3, U1, Y1*	$7.50 *I3, U1, Y1*	6.20 *U1, Y1*
	Granite City, Ill.	4.25 *G2*	5.15 *G2*	5.65 *G2*	5.575 *G2*								$7.60 *G2*	6.30 *G2*
	Kokomo, Ind.	4.15 *C9*		5.55 *C9*						5.20 *C9*	4.775 *C9*			
	Mansfield, Ohio					5.85 *E2*				5.175 *E2*				
	Middletown, Ohio		4.95 *A7*	5.45 *A7*	5.375 *A7*	5.85 *A7*								
	Niles, Warren, Ohio Sharon, Pa.	4.05 *S1, R3* 5.30 *N3*	4.95 *R3* 5.975 *N3*	5.45 *N3, R3*	6.725 *N3*	5.85 *N3*	6.10 *S1, R3*	7.50 *R3*				$8.90 *R3*	$7.50 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.05 *J3, U1, P6*	4.95 *J3, U1, P6*	5.45 *U1*	5.375 *U1*		6.10 *J3, U1*	7.50 *J3, U1*	8.20 *U1*		4.675 *A5* 4.875 *P6*	$8.90 *J3, U1*	$7.50 *J3, U1*	6.20 *U1*
	Portsmouth, Ohio	4.05 *P7*	4.95 *P7*								4.675 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.05 *W3, W5*	4.95 *W3, W5, F3*	5.45 *W3, W5*		5.85 *W3, W5*	6.10 *W3*	7.50 *W3*				$8.90 *W3, W5*	$7.50 *W3, W5*	6.20 *F3, W5*
	Youngstown, Ohio	4.05 *U1, Y1*	4.95 *Y1*		5.375 *Y1*		6.10 *U1, Y1*	7.50 *Y1*			4.675 *Y1*			
WEST	Fontana, Cal.	4.825 *K1*	6.05 *K1*				6.875 *K1*	8.55 *K1*			5.475 *K1*			
	Geneva, Utah	4.15 *C7*												
	Kansas City, Mo.										4.925 *S2*			
	Los Angeles, Torrance, Cal.										5.475 *C7, B2*			
	Minnequa, Colo.										4.925 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	4.75 *C7*	5.90 *C7*	6.20 *C7*							5.325 *C7*	$9.55 *C7*	$8.25 *C7*	
	Seattle, Wash.													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	4.05 *R3, T2*	4.95 *T2*	5.45 *R3, T2*			6.10 *T2*			5.35 *R3*	4.675 *T2, R3*	$8.90 *T2*	$7.60 *T2*	
	Houston, Tex.										4.925 *S2*			

IRON AGE

STEEL PRICES

(Effective June 21, 1965)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				5.075 *B3*	6.625 *B3*	6.45 *B3*					
	Buffalo, N. Y.	4.30 *B3,R3*	4.30 *B3,R3*	5.45 *B3*	5.075 *B3,R3*	6.625 *B3,B5*	6.45 *B3*	4.225 *B3,R3*			6.45 *B3*	5.75 *W6*
	Claymont, Del.							4.225 *C4*		5.80 *C4*		
	Centerville, Pa.							4.225 *L4*		5.80 *L4*	6.45 *L4*	
	Conshohocken, Pa.							4.225 *A2*	5.275 *A2*		6.45 *A2*	
	Harrisburg, Pa.							4.225 *C3*	5.275 *C3*			
	Hartford, Conn.			5.90 *R3*		6.925 *R3*						
	Johnstown, Pa.	4.30 *B3*	4.30 *B3*		5.075 *B3*		6.45 *B3*	4.225 *B3*		5.80 *B3*	6.45 *B3*	5.75 *B3*
	Fairless, Pa.	4.45 *U1*	4.45 *U1*		5.225 *U1*							
	Newark, N. J.			5.95 *W10*		6.80 *W10*						
	Camden, N. J.			5.85 *P10*								
	Bridgeport, Putnam, Conn.	4.95 *N8*		5.95 *W10*	5.225 *N8*			4.475 *N8*				
	Sparrows Pt., Md.		4.30 *B3*					4.225 *B3*		5.80 *B3*	6.45 *B3*	5.85 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			5.85 *W11* 5.95 *B5,C14*		6.925 *A5,B5*						6.05 *A5, W6*
MIDDLE WEST	Alton, Ill.	4.50 *L1*										5.925 *L1*
	Ashland, Newport, Ky.							4.225 *A7,N5*		5.80 *N5*		
	Canton-Massillon, Mansfield, Ohio	4.40 *R3*		5.40 *R2,R3*	5.075 *R3,T5*	6.625 *R2,R3, T5*		4.225 *E2*				
	Chicago, Joliet, Ill.	4.30 *U1, N4,W8,R3, P13*	4.30 *N4,R3, P13*	5.40 *A5,W10, W8,B5,L2*	5.075 *U1,R3, W8*	6.625 *A5,W8, W10,L2,B5*		4.225 *U1,W8, I3,A1,R3*	5.275 *U1*	5.80 *U1*	6.45 *U1*	5.75 *A5, R3,N4,W7*
	Cleveland, Ohio	4.30 *R3*	4.30 *R3*	5.40 *A5,C13*		6.625 *A5,C13*	6.45 *R3*	4.225 *J3,R3*	5.275 *J3*		6.45 *J3,R3*	5.75 *A5, C13*
	Detroit, Mich.	4.40 *G3* 4.45 *R5*		5.40 *R5* 5.80 *B5,P8* 5.45 *P5*	5.075 *R5* 5.175 *G3*	6.625 *R5* 6.825 *B5,P3 P8*	6.55 *G3*	4.325 *G3*			6.55 *G3*	
	Duluth, Minn.											5.75 *A5*
	Gary, Ind. Harbor, Crawfordsville	4.30 *I3, U1, Y1*	4.30 *I3, U1, Y1*	5.40 *M5,R3,*	5.075 *I3, U1, Y1*	6.625 *M5, R3*	6.45 *U1,I3, Y1*	4.225 *I3, U1,Y1*	5.275 *I3*	5.80 *U1,Y1*	6.45 *U1,I3, Y1*	5.85 *M4*
	Granite City, Ill.							4.425 *G2*				
	Kokomo, Ind.											5.85 *C9*
	Sterling, Ill.	4.85 *N4*	4.40 *N4*									5.85 *N4*
	Niles, Ohio Sharon, Pa.	4.30 *R3*					6.45 *R3*	4.225 *S1,R3*		5.80 *S1*	6.45 *S1*	
	Pittsburgh, Pa. Midland, Pa.	4.30 *J3, U1, C11*	4.30 *J3, U1*	5.40 *A5,C8, C11,J3 W10,B4,R3*	5.075 *U1,C11*	6.625 *A5,C11, W10,C8,R3*	6.45 *J3, U1*	4.225 *J3, U1*	5.275 *U1*	5.80 *U1*	6.45 *J3, U1*	5.75 *A5,J3, P6*
	Portsmouth, Ohio											5.75 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	4.30 *W3*						4.225 *W3, W5*				
	Youngstown, Ohio	4.30 *U1, Y1, C10,R3*	4.30 *U1, Y1, R3*	5.40 *F2, Y1, C10*	5.075 *U1, Y1, C10*	6.625 *Y1,C10* 6.665 *F2*	6.45 *U1, Y1*	4.225 *U1, Y1, R5*		5.80 *Y1*	6.45 *Y1*	5.75 *Y1*
WEST	Emeryville, Cal.	5.05 *J5*	5.05 *J5*									
	Fontana, Cal.	5.00 *K1*	5.00 *K1*		6.125 *K1*		7.70 *K1*	4.875 *K1*		6.45 *K1*	7.15 *K1*	
	Geneva, Utah							4.225 *C7*			6.45 *C7*	
	Kansas City, Mo.	4.55 *S2*	4.55 *S2*		5.325 *S2*		6.70 *S2*					6.00 *S2*
	Los Angeles, Torrance, Cal.	5.00 *B2,C7*	5.00 *B2,C7*	6.05 *R3*	6.125 *B2*		7.15 *B2*					6.70 *B2*
	Minnequa, Colo.	4.75 *C6*	4.75 *C6*					5.075 *C6*				6.80 *C6*
	Portland, Ore.	5.05 *O2*	5.05 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	5.00 *C7,P9* 5.05 *B2*	5.00 *C7,P9* 5.05 *B2*				7.20 *B2*					6.70 *C7*
	Seattle, Wash.	5.05 *B2,P12, N6*	5.05 *B2,P12*				7.20 *B2*	5.125 *B2*		6.70 *B2*	7.35 *B2*	
SOUTH	Atlanta, Ga.	4.50 *A8*	4.50 *A8*									5.95 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	4.30 *T2,C16, R3*	4.30 *T2,C16, R3*				6.45 *T2*	4.225 *T2,R3*			6.45 *T2*	5.75 *R3, T2*
	Houston, Ft. Worth, Lone Star, Tex.	4.55 *S2*	4.55 *S2*		5.325 *S2*		6.70 *S2*	4.55 *L3* 4.275 *S2*		5.85 *S2*	6.50 *S2*	6.00 *S2*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.
D5 Henry Disston & Sons, Inc., Philadelphia

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N5 Newport Steel Corp., Newport, Ky.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P12 Pacific Steel Rolling Mills, Seattle
P13 Phoenix Mfg. Co., Joliet, Ill.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw & Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wycoff Steel Co., Pittsburgh
W11 Worcester Pressed Steel Co., Worcester, Mass.

Y1 Youngstown Sheet & Tube Co., Youngstown

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	⅛ In.		¼ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	30.75	16.25	32.25	16.0								
Youngstown *R3*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0								
Fontana *K1*	10.75	+4.5	13.75	+0.5	16.25	3.0	18.75	3.75	19.25	4.75	19.75	5.25	21.25	5.0								
Pittsburgh *J3*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	+1.50	17.5	0.75	20.0	3.25	21.5	4.75
Alton, Ill. *L1*	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	30.75	16.25	32.25	16.0								
Sharon *M3*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0								
Fairless *N2*	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	30.75	16.25	32.25	16.0								
Pittsburgh *N1*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	+1.50	17.5	0.75	20.0	3.25	21.5	4.75
Wheeling *W5*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0								
Wheatland *W4*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0								
Youngstown *Y1*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	+1.50	17.5	0.75	20.0	3.25	21.5	4.75
Indiana Harbor *Y1*	22.75	7.5	25.75	11.5	28.25	15.0	30.75	15.75	31.25	16.75	31.75	17.25	33.25	17.0								
Lorain *N2*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	+1.50	17.5	0.75	20.0	3.25	21.5	4.75
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	25.25	11.5	29.25	15.5	31.25	19.0	31.75	17.75	32.25	18.75	32.75	19.25	33.25	18.0								
Youngstown *R3*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0								
Fairless *N2*	25.25	11.5	29.25	15.5	31.25	19.0	31.75	17.75	32.25	18.75	32.75	19.25	33.25	18.0								
Fontana *K1*	14.25		18.25		20.25		20.75		21.25		21.75		22.25									
Pittsburgh *J3*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0	14.0		19.0	3.25	21.5	5.75	26.5	10.75
Alton, Ill. *L1*	25.25	11.5	29.25	15.5	31.25	19.0	31.75	17.75	32.25	18.25	32.75	19.25	33.25	18.0								
Sharon *M3*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0								
Pittsburgh *N1*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	14.0		19.0	3.25	21.5	5.75	26.5	10.75
Wheeling *W5*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0								
Wheatland *W4*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0								
Youngstown *Y1*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	14.0		19.0	3.25	21.5	5.75	26.5	10.75
Indiana Harbor *Y1*	26.25	12.5	30.25	16.5	32.25	20.0	32.75	18.75	33.25	19.75	33.75	20.75	34.25	19.0								
Lorain *N2*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	14.0		19.0	3.25	21.5	5.75	26.5	10.75

Threads only, buttweld and seamless 2¼ pt higher discount. Plain ends, buttweld and seamless, 2-in. and under, 4½ pt higher discount. Buttweld jobbers discount, 5 pct.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ incl. per lb, East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt. e.g., zinc price range of over 11¢ to 13¢ would lower discounts; zinc price in range of over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 12.50¢ per lb.

Steel Prices *(Effective June 21, 1955)*

To identify producers, see Key on preceding page.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer *U1*	4.45	5.35	5.425				
So. Chicago *R3*				7.30			
Ensley *T2*	4.45	5.35					
Fairfield *T2*		5.35		7.30		5.275	
Gary *U1*	4.45	5.35				5.275	
Ind. Harbor *I3*	4.45		5.425	7.30		5.275	
Johnstown *B3*		5.35					
Joliet *U1*		5.35	5.425				
Kansas City *S2*				7.30			11.50
Lackawanna *B3*	4.45	5.35	5.425			5.275	
Minnequa *C6*	4.45	5.85	5.425	7.30		5.275	11.50
Pittsburgh *O1*					11.00		11.50
Pittsburgh *P5*					11.00		11.50
Pittsburgh *J3*				7.30			
Seattle *B2*				7.80		5.425	12.00
Steelton *B3*	4.45		5.425			5.275	
Struthers *Y1*				7.30			
Terrance *C7*						5.425	
Williamsport *S5*		5.35					
Youngstown *R3*				7.30			

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field	8.025	8.225	
Armature	8.50	8.75	9.25
Elect.	9.10	9.35	9.85
Motor	10.10	10.35	10.85
Dynamo	11.00	11.25	11.75
Trans. 72	11.95	12.20	12.70
Trans. 65	12.50	Grain Oriented	
Trans. 58	13.00	Trans. 80	16.60
Trans. 52	14.00	Trans. 73	17.10

Producing points: Beech Bottom (*W5*); Brackenridge (*A5*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N3*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville (*A7*).

* Coils 75¢ higher.

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence 9-15½ ga.	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Annl'd ¢/lb.	Merch. Wire Galv. ¢/lb.
	Col	Col	Col	Col	Col		
Alabama City *R3*	137	146		155	159	6.90	7.30
Aliquippa, Pa. *J3*	137	149			156	6.90	7.45
Atlanta *A8*	139	151		157	164	7.00	7.525
Bartonville *K2*	139	151		157	164	7.00	7.55
Buffalo *W6*						6.90	7.30
Chicago, Ill. *N4*	137	150		155	163	6.90	7.475
Cleveland *A6*	142						
Cleveland *A5*						6.90	
Crawfordsville *M4*	139	151		157	159	7.00	7.55
Donora, Pa. *A5*	137	149		155	162	6.90	7.45
Duluth *A5*	137	149	150	155	162	6.90	7.45
Fairfield, Ala. *T2*	137	149		155	162	6.90	7.45
Galveston *D4*	139						
Houston *S2*	142	154			164	7.15	7.70
Johnstown, Pa. *B3*	137	149			162	6.90	7.45
Joliet, Ill. *A5*	137	149		155	162	6.90	7.45
Kokomo, Ind. *C9*	139	148		157	161	7.00	7.55
Los Angeles *B2*					7.85		
Kansas City *S2*	142	158		167	164	7.15	7.90
Minnequa *C6*	142	151	155	160	164	7.15	7.55
Monessen *P6*	137	151			163	6.90	7.45
Moline, Ill. *R3*			155				
Pittsburg, Cal. *C7*	156	172		179	182	7.85	8.40
Portsmouth *P7*						6.90	7.90
Rankin, Pa. *A5*	137	149			162	6.90	7.45
So. Chicago *R3*	137	146	150		159	6.90	7.30
S. San Francisco *C6*					179		
Sparrows Pt. *B3*	139			157	164	7.00	7.55
Struthers, O. *Y1*						6.90	7.55
Worcester *A5*	143					7.20	
Williamsport, Pa. *S5*			150				

Cut Nails, carloads, base $8.30 per keg at Conshohocken, Pa. (*A2*). Galvanized products computed with zinc at 11.0¢ per lb. Exceptions: Alabama City and So. Chicago computed with zinc at 5¢; Chicago, zinc 12¢.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Bridgeport, New Britain, Conn. *N8*	5.75	8.05	9.00	11.15	13.85
Buffalo, N. Y. *R7*	5.75	8.05	9.00	10.95	13.25
Carnegie, Pa. *S9*		8.05	9.00	11.15	13.85
Cleveland *A5*	5.75	8.05	9.00	11.15	13.85
Detroit *D1*	5.85	8.25	9.20	10.95	
Detroit *D2*	5.85	8.25	9.20		
Harrison, N. J. *C11*			9.30	11.45	14.15
Indianapolis *C5*	6.00	8.20	9.00	11.15	13.85
New Castle, Pa. *B4*	5.75	8.05	9.00	10.95	
New Haven, Conn. *D1*	6.20	8.35	9.30	11.25	
Pawtucket, R. I. *N7*	6.20	8.35	9.30	11.45	14.15
Riverdale, Ill. *A1*	5.85	8.05	9.00	11.15	13.85
Sharon, Pa. *S1*	5.75	8.05	9.00	11.15	13.85
Trenton *R4*		8.35	9.30	11.25	13.40
Wallingford *W1*	6.20	8.35	9.30	11.45	14.15
Warren, Ohio *T4*	5.75	8.05	9.00	11.15	13.85
Weirton, W. Va. *W3*	5.85	8.05	9.00	10.95	13.25
Worcester, Mass. *A5*	6.60	8.35	9.30	11.45	14.15
Youngstown *C5*	5.85	8.05	9.00	11.15	13.85

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	28.33	33.97	27.48	32.95
	2½	12	38.15	45.74	37.00	44.36
	3	12	44.05	52.82	42.72	51.23
	3½	11	51.43	61.66	49.88	59.81
	4	10	68.29	81.88	66.24	79.42
National Tube	2	13	28.33	33.97	27.48	
	2½	12	38.15	45.74	37.00	
	3	12	44.05	52.82	42.72	
	3½	11	51.43	61.66	49.88	
	4	10	68.29	81.88	66.24	
Pittsburgh Steel	2	13	28.33	33.97		
	2½	12	38.15	45.74		
	3	12	44.05	52.82		
	3½	11	51.43	61.66		
	4	10	68.29	81.88		

WAREHOUSES

Base price, f.o.b., dollars per 100 lb.

City	City Delivery Charge	Sheets Hot-Rolled	Sheets Cold-Rolled	Sheets Galvanized (10 gage)	Strip Hot-Rolled	Strip Cold-Rolled	Plates	Shapes Standard Structural	Bars Hot-Rolled	Bars Cold-Finished	Alloy Bars Hot-Rolled 4615 As rolled	Alloy Bars Hot-Rolled 4140 Annealed	Alloy Bars Cold-Drawn 4615 As rolled	Alloy Bars Cold-Drawn 4140 Annealed
Baltimore	$.20	6.62	7.51	7.75-7.89	6.69	.....	6.37	6.72	6.68	8.02	12.94	12.54	15.34	15.19
Birmingham	.15	6.35-6.50	7.35-8.10	8.25-9.00	6.60	8.85	6.45	6.45	6.50	8.85	.....	16.80	.....	19.80
Boston	.10	7.23	8.23-8.78	9.57	7.47	9.75	7.37	7.49	7.20	8.60	12.85-13.00	12.60	15.40	15.25
Buffalo	.25	6.30	7.40	8.84	6.65	7.62	6.60	6.67	6.45	7.40	12.70	12.15-12.30	15.10	14.95
Chicago	.20	6.38	7.36	8.30	6.62	.....	6.52	6.60	6.51	7.25	12.25	12.03	14.60	14.70
Cincinnati	.20	6.49-6.63	7.37-7.42	8.25-8.30	6.86-6.91	.....	6.81-6.86	6.86	6.75-6.80	7.55	12.55	12.30	14.90	14.95
Cleveland	.20	6.38	7.38	8.25	6.72	.....	6.69	7.02	6.57	7.35	11.96	12.11	.....	14.76
Denver		8.15	9.80-10.05	10.72	8.40	.....	8.10	8.15	8.30	9.92	.....	.....	.....	17.12
Detroit	.20	6.57	7.57	8.58	6.90	.....	6.80	7.16	6.79	7.54	12.65	12.25	15.05	14.90
Houston		7.35	7.80	9.93-9.99	7.70	.....	7.35	7.60	7.70	9.30-9.40	.....	13.25	.....	.....
Kansas City	.20	7.05	8.05	8.97	7.29	.....	7.19-7.39	7.36	7.18	8.02	13.12	12.72	15.52	15.37
Los Angeles	.10	7.50	9.35	9.95	7.65	.....	7.45	7.65	7.45-7.55	10.15*	.....	13.45	.....	16.60
Memphis	.10	6.79	7.69	.....	6.90	.....	7.01	7.00	6.88	8.65	.....	.....	.....	.....
Milwaukee	.20	6.47	7.47	8.21-8.39	6.71	.....	6.61	6.86	6.60	7.44	12.34	12.14	14.69	14.79
New Orleans	.15	6.70	7.65	9.23	6.80	.....	6.90	7.05	6.80	8.60-10.70	.....	.....	.....	.....
New York	.10	6.97-7.07	7.91-8.56	8.79-8.89	7.56-7.66	10.15	7.27-7.37	7.38-7.48	7.37-7.47	8.73-8.83	12.63	12.43	.....	15.08
Norfolk	.25	7.00	.....	.....	7.10	.....	7.10	7.10	7.10	8.60	.....	.....	.....	.....
Philadelphia	.10	6.19	7.44	8.20[4]	6.96	.....	6.49	6.54	6.74	7.86	12.61-12.76	12.26-12.36	15.06-15.16	14.99-15.01
Pittsburgh	.20	6.38	7.38	8.30	6.72	.....	6.52	6.60	6.51	7.35	12.45	12.05	14.85	14.70
Portland	.20	7.00-7.80	7.75	9.10	7.05-7.25	.....	6.85	7.00	7.05	10.20-11.70	.....	.....	.....	.....
Salt Lake City	.20	7.65	10.20	10.70	9.05	.....	7.70	7.70-8.05	8.80	10.95	.....	.....	.....	.....
San Francisco	.10	7.30-	8.90-	9.40-	7.75-	.....	7.35-	7.45-	7.30-	10.00-	.....	13.30-	.....	16.45-
	.20	7.55	8.95	9.45	7.80		7.40	7.50	7.35	10.05		13.35		16.50
Seattle	.60	8.10	9.80	10.15	8.20	.....	7.80	7.75	7.80	10.95	.....	13.60	.....	16.45
St. Louis	.20	6.67	7.67	8.59	6.91	.....	6.81	7.09	6.80	7.84	12.74	12.34	15.14	14.99
St. Paul	.20	7.04	8.04	8.96	7.28	.....	7.18	7.35	7.17	8.01	.....	12.71	.....	15.36

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.

Exceptions: (1) 1500 to 9999 lb. (2) 1000 lb or over. (3) $.25 delivery. (4) 1000 to 1999 lb, $.25 delivery.

* Plus analysis charge.

Miscellaneous Prices

(Effective June 21, 1955)

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb
18	4	1	—	—	$1.54
18	4	1	—	5	2.245
18	4	2	—	—	1.705
1.5	4	1.5	8	—	.90
6	4	2	6	—	1.29

High-carbon chromium	.73
Oil hardened manganese	.405
Special carbon	.27
Extra carbon	.31
Regular carbon	.26

Warehouse prices on and east of Mississippi are 2.5¢ per lb higher. West of Mississippi, 5.5¢ higher.

CLAD STEEL

Base prices, cents per lb, f.o.b.

	Cladding	Plate (*A3, J2, L6*) 10 pct	Plate (*A3, J2, L6*) 15 pct	Plate (*A3, J2, L6*) 20 pct	Sheet (*J2*) 20 pct
Stainless Type	304	28.30	30.95	33.60	29.75
	316	33.40	36.10	38.80	42.75
	321	30.00	32.65	35.30	34.25
	347	32.20	35.40	38.60	44.25
	405	23.90	27.50	31.10	.....
	410, 430	23.40	27.00	30.60	.....

CR Strip (*S9*) Copper 10 pct 2 sides 33.00 1 side 26.00

LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered lower Lake ports. Prices effective for 1955 season.

	Gross Ton
Openhearth lump	$11.25
Old range, bessemer	10.40
Old range, nonbessemer	10.25
Mesabi, bessemer	10.25
Mesabi, nonbessemer	10.10
High phosphorus	10.00

COKE

	Net-Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$13.00 to $13.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$16.00 to $16.50
Foundry, oven coke	
Buffalo, del'd	$28.08
Chicago, f.o.b.	24.50
Detroit, f.o.b.	25.50
New England, del'd	26.05
Seaboard, N. J., f.o.b.	24.50
Philadelphia, f.o.b.	24.00
Swedeland, Pa., f.o.b.	24.00
Plainesville, Ohio, f.o.b.	25.50
Erie, Pa., f.o.b.	25.00
Cleveland, del'd	27.42
Cincinnati, del'd	26.56
St. Paul, f.o.b.	23.75
St. Louis, f.o.b.	26.00
Birmingham, f.o.b.	22.65
Lone Star, Tex., f.o.b.	18.50

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (in.)	Length (in.)	Price	CARBON* Diam. (in.)	Length (in.)	Price
24	84	22.00	48	110	10.00
20	72	21.25	40	100, 110	9.50
16 to 18	72	21.00	35	110	9.50
14	72	22.00	30	110	9.00
12	72	22.25	24	72 to 84	9.00
8 to 10	60	22.75	20	90	9.00
7	60	23.00	17	72	9.00
6	60	23.50	14	72	10.25
4	48	25.50	10, 12	60	11.10
3	40	30.00	8	60	11.40
2½	30	30.75			
2	24	47.75			

* Prices shown cover carbon nipples.

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolts

	Discount Less Case	Discount C.
½ in. & smaller x 4 in. & shorter	2	22
½ in. & smaller x 6 in. & shorter	+3	18
9/16 in. & ⅝ in. x 6 in. & shorter	+4	17
¾ in. & larger x 6 in. & shorter	+6	15
All diam. longer than 6 in.	+15	8
½ in. & smaller x 6 in. & shorter	+3	18
Lag, all diam. x 6 in. & shorter	6	25
Lag, all diam. longer than 6 in.	+2	19
Plow bolts	23	23

Nuts, H.P., C.P., reg. & hvy.

	Base Discount	Discount, Case or Keg
¾" or smaller	55	64
⅞" to 1⅛" inclusive	58	66
1¼" to 1½" inclusive	60	67½

C.P. Hex. regular & hvy.

All sizes	55	64

Hot Galv Nuts (all types)

⅝" or smaller	38	50
⅞" to 1½" inclusive	41	52½

Finished, Semi-finished, Slotted or Castellated Nuts

All sizes	55	66

Rivets

	Base per 100 lb
½ in. & larger	$9.25
	Pct Off List
7/16 in. and smaller	37

Cap Screws

	Discount Bright	Discount H.C. Heat Treated
New std. hex head, packaged ⅝" x 6" and smaller and shorter	38	28
¾", ⅞", 1" x 6" and shorter	15	1
New std. hex head, bulk* 5" x 6" and smaller and shorter	50	42
¾", ⅞", 1" x 6" and shorter	32	21

*Minimum quantity per item:
15,000 pieces ¼", 5/16", ⅜" diam.
5,000 pieces 7/16", ½", 9/16", ⅝" diam.
2,000 pieces ¾", ⅞", 1" diam.

Machine Screws & Stove Bolts

		Discount Mach. Screws	Discount Stove Bolts
Packaged, package list		33	42
Bulk, bulk list	Quantity		
¼-in. diam. & under	15,000- 99,999	17	59
	100,000-199,999	25	62
	200,000 & over	33	67
5/16-in. diam. & larger	15,000- 49,999	17	59
	50,000- 99,999	25	62
	100,000 & over	33	67
All diam. over 3 in. long	5,000- 49,999	..	59
	50,000- 99,999	..	62
	100,000 & over	..	67

Machine Screw & Stove Bolt Nuts

		Discount Hex	Discount Square
Packaged, package list		30	33
Bulk, bulk list	Quantity		
⅜-in. diam. & smaller	15,000- 99,999	15	17
	100,000-199,999	23	25
	200,000 & over	31	33

REFRACTORIES

Fire Clay Brick

Carloads per 1000

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00)	$114.00
No. 1 Ohio	107.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	107.00
No. 2 Ohio	98.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	17.00

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$120.00
Childs, Hays, Pa.	125.00
Chicago District	130.00
Western Utah	.....
California	.....
Super Duty Hays, Pa., Athens, Tex., Windham	137.00
Curtner, Calif.	155.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	20.00
Silica cement, net ton, bulk, Hays, Pa.	22.00
Silica cement, net ton, bulk, Chicago District, Ensley, Ala.	21.00
Silica cement, net ton, bulk, Utah and Calif.	.....

Chrome Brick

Per net ton

Standard chemically bonded, Balt.	$86.00
Standards chemically bonded, Curtner, Calif.	96.25
Burned, Balt.	80.00

Magnesite Brick

Standard Baltimore	$109.00
Chemically bonded, Baltimore	97.50

Grain Magnesite

St. ⅝-in., grains

Domestic, f.o.b. Baltimore in bulk fines removed	$64.40
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	38.00
in sacks	43.75

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in: Pa., W. Va., Ohio	$14.50
Midwest	15.10
Missouri Valley	13.65

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	11.25¢
Canadian sponge iron, Del'd in East, carloads	9.5¢ / 10.75¢
Domestic sponge iron, 98+% Fe, carload lots	9.5¢
Electrolytic iron, annealed, imported 99.5+% Fe	37.5¢
domestic 99.5+% Fe	36.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	53.5¢
Hydrogen reduced iron minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 00.8+% Fe	83.0¢ to $1.43
Aluminum	31.5¢
Brass, 10 ton lots	29.50¢ to 36.50¢
Copper, electrolytic	51.50¢
Copper, reduced	51.50¢
Cadmium, 100-199 lb. 95¢ plus metal value	
Chromium, electrolytic, 99% min., and quality, del'd	$3.60
Lead	23.50¢
Manganese	57.0¢
Molybdenum, 99%	$2.75
Nickel, unannealed	89.50¢
Nickel, annealed	96.50¢
Nickel, spherical, unannealed	93.50¢
Silicon	43.50¢
Solder powder 7.0¢ to 9.0¢ plus met. value	
Stainless steel, 302	91.0¢
Stainless steel, 316	$1.10
Tin	14.04¢ plus metal value
Tungsten, 99% (65 mesh)	$4.05
Zinc, 10 ton lots	17.5¢ to 25.0¢

Ferroalloy Prices

(Effective June 21, 1954)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd, 65-72% Cr, 2% max Si.

0.025% C	36.00	0.15% C	33.75
0.025% C, Simplex	34.50	0.20% C	33.50
		0.50% C	33.25
0.06% C	34.50	1.00% C	33.00
0.10% C	34.00	2.00% C	32.75

65-69% Cr, 4-9% C 24.75
62-66% Cr, 4-6% C, 6.9% Si 25.60

S. M. Ferrochrome

Contract prices, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60.55% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	25.85
Ton lots	28.00
Less ton lots	29.50

High Nitrogen Ferrochrome

Low-carbon type 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 3¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.18
0.50% max. C	1.16
9 to 11% C	1.25

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed, lump 4-in. x down, 24.75¢ per lb contained Cr plus 12.00¢ per lb contained Si. Bulk 2-in. x down, 25.05¢ per lb contained Cr plus 10.80¢ per lb contained Si. Bulk 1-in. x down, 25.25¢ per lb contained Cr plus 11.00¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, lump, delivered.

30-33% Ca, 60-65% Si, 3.00 max. Fe.

Carloads	19.00
Ton lots	22.10
Less ton lots	23.60

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	20.00
Ton lots	22.30
Less ton lots	23.30

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	17.50
Less ton lots	19.50

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	16.60
Ton lots	18.10
Less ton lots	19.35

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	17.50
Ton lots to carload packed	18.50
Less ton lots	20.00

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	9.50
Clairton, Pa.	9.50
Sheridan, Pa.	9.50
Philo, Ohio	9.50

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	11.85
Ton lots packed	13.65

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$84.00
19 to 21%	3% max.	86.00
21 to 23%	3% max.	88.50
23 to 25%	3% max.	91.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.00
Ton lots	48.50

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	30.00
Ton lots	32.00
250 to 1999 lb	34.00
Premium for hydrogen-removed metal	0.75

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn ..... 21.35¢

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	32.00	33.85	35.05
0.07% max. C	29.95	31.80	33.80
0.15% max. C	28.45	30.30	31.50
0.30% max. C	26.95	28.80	30.00
0.50% max. C	26.45	28.30	29.50
0.75% max. C, 80-85% Mn, 5.0-7.0% Si	23.45	25.30	26.50

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢.

Carload bulk	11.00
Ton lots	12.65
Briquet contract basis carlots, bulk, delivered, per lb of briquet	12.45
Ton lots, packed	14.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $85.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $88.00. Add $1.00 per ton for each additional 0.50% Si up to and including 17%. Add $1.45 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots	Carloads
96% Si, 2% Fe	20.10	18.00
97% Si, 1% Fe	20.60	18.50

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk	6.55
Ton lots	8.35

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, delivered.

25% Si	20.00	75% Si	14.40
50% Si	12.00	85% Si	16.10
65% Si	13.50	90% Si	17.25

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrovanadium

35-55% contract, basis, delivered, per pound, contained V.

Openhearth	$3.00-$3.10
Crucible	3.16- 3.20
High speed steel (Primos)	3.20- 3.25

Alsifer, 20% Al, 40% Si, 40% Fe,

Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	9.25¢
Ton lots	10.15

Calcium molybdate, 46.3-46.6%

f.o.b. Langeloth, Pa., per pound contained Mo $1.28

Ferrocolumbium, 50-60%, 2 in. x D contract basis, delivered per pound contained Cb.

Ton lots	$12.00
Less ton lots	12.05

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb con't Cb plus Ta $6.25

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo .. $1.46

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton $90.00
10 tons to less carload $110.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.55

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton $177.00

Ferrotungsten, ½ x down, packed, per pound contained W, ton lots, f.o.b. $3.80

Molybdic oxide, briquets, per lb contained Mo, f.o.b. Langeloth, Pa. $1.27
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.24

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b Philo, Ohio, freight allowed, per lb.

Carload, bulk lump	15.50¢
Ton lots, packed lump	16.75¢
Less ton lots, lump, packed	17.25¢

Vanadium Pentoxide, 86 - 89% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.28

Zirconium, contract basis, per lb of alloy.

35-40%, f.o.b. freight allowed, ton lots	26.00¢
12-15%, del'd, lump, bulk-carloads	8.00¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed. B, 3.14%, Si, 40-45%, per lb contained 2 .... $5.25

Bortam, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.

Ton lots per pound	10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in., x D, Ton lots ... $1.20
F.o.b. Wash., Pa.; 100 lb up

10 to 14% B	.85
14 to 19% B	1.30
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over

No. 1	$1.00
No. 6	63¢
No. 79	50¢

Manganese - Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots	$1.46
Less ton lots	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots $2.05

Silcaz, contract basis, delivered.

Ton lots	45.00¢

Built stronger, tougher and lighter with USS MAN-TEN Steel

Famous HYSTER Logging Arch handles more footage faster

In this "packaged" logging unit, consisting of a Hyster Arch Towing Winch and Caterpillar Diesel Tractor, the objective of the engineers was to produce equipment having the highest degree of mechanical efficiency, plus durability and speed of operation.

Because the key to profits is greater log production, which means that unnecessary breakdowns must be eliminated, extra margins of safety have been built into all parts subjected to stresses and wear.

By using USS MAN-TEN High Strength Steel in the arch boom, A-frame and tongue, it was possible to reduce weight of these important members by 10%, and yet to *increase* their strength-to-weight ratio over former construction.

The increased strength provided by MAN-TEN Steel gives the arch the ability to handle log loads of maximum size, and the reduced arch weight means greater mobility and maneuverability. Result: The operator can get into tight spots easier and pick up loads faster. Reduced weight also permits greater grade climbing ability in steeper terrain.

With USS High Strength Steels — USS MAN-TEN, USS COR-TEN and USS TRI-TEN—you can build extra strength and toughness into vital parts and ensure greater resistance to wear, fatigue, abrasion and impact.

Photographs courtesy of HYSTER COMPANY, Portland, Oregon

NOW AVAILABLE . . . Our new "Design Manual for High Strength Steels" is ready for distribution. This excellent book contains comprehensive and practical information that you will find extremely useful in designing your product for greater economy and efficiency by the sound use of high strength steels.

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USS MAN-TEN HIGH Strength STEEL

USS

S-1028

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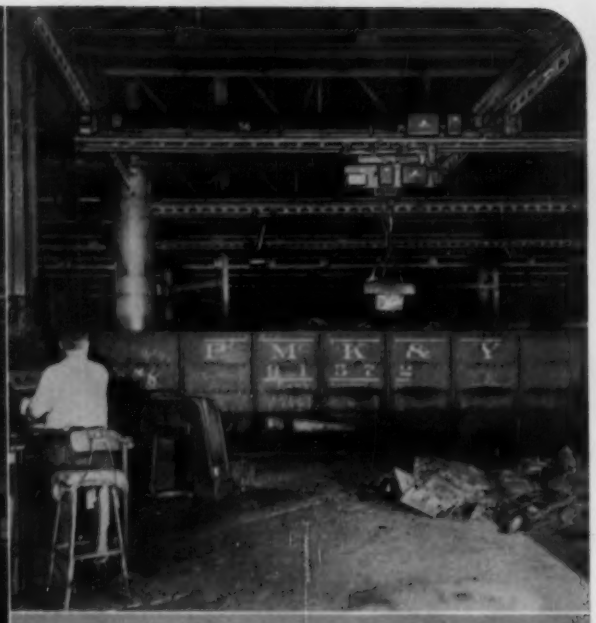
UNITED STATES STEEL



Baled scrap is handled directly from baler to railroad car by the same crane.

Scrap from slat conveyor is dumped on floor at left. Crane with magnet then takes it to baling machine next to operator who operates all controls — crane, magnet, baler — from this one point.

CRANE HANDLES *ONE CARLOAD OF SCRAP* THROUGH BALER *EVERY TWO DAYS*

Both Crane and Baler Operated by One-Man Pulpit Control

SCRAP handling and baling have been made an extremely efficient one-man job at the Buffalo, N. Y., electric motor plant of Westinghouse Electric Corporation with a Cleveland Tramrail crane. Scrap metal is collected on a slat conveyor which extends some 300 feet under the floor, serving a number of punch presses. Near the baling department it is conveyed up an incline and dumped on the floor. Here a 3-ton, 3-runway magnet-handling Cleveland Tramrail crane takes over. It brings the scrap to a baling machine sunk in the floor. The scrap bales made here are placed into a gondola car by the same crane. The entire operation of crane and baling machine is controlled by one man seated at a pulpit, working with push buttons.

Bales measure about 10"x12"x18" and weigh an average of 300 lbs. From 300 to 425 bales are required to fill a railroad car depending upon car capacity. Approximately one carload is baled and shipped every two days, working two shifts (16 hours) a day.

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- Improved castings result from the advanced techniques and the high sense of responsibility of Society members.

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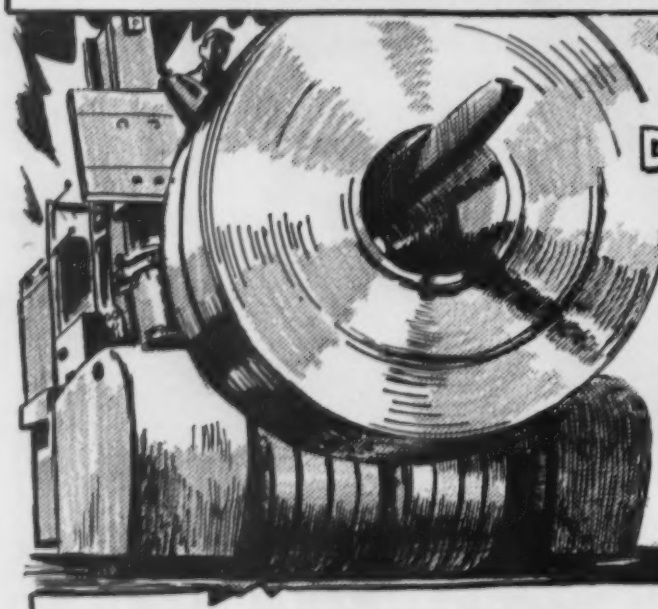
FACTS ABOUT Exide®

IRONCLAD® INDUSTRIAL TRUCK BATTERIES

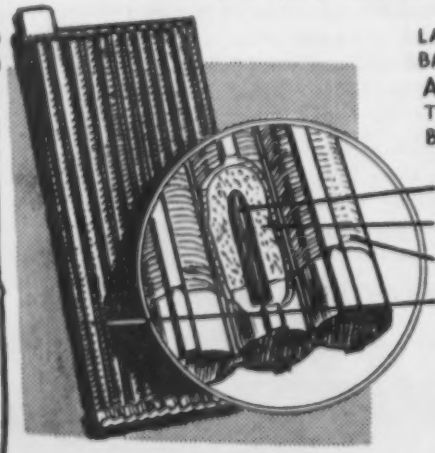


DOING A GIANT'S WORK AT LOWEST COST WITH EXIDE-IRONCLADS

STEEL MILLS USE GIANT **EXIDE-POWERED** RAM TRUCKS TO HANDLE HUGE COILS OF SHEET STEEL WEIGHING AS MUCH AS 30 TONS EACH. THEY WORK FULL-SHIFT WITHOUT COSTLY DOWN-TIME DELAYS -AROUND THE CLOCK. **EXIDE** DEPENDABILITY AND EXCEPTIONALLY LONG USEFUL LIFE RESULTS IN LOWEST HANDLING COSTS PER TON.

BATTERIES ARE WORKED TO DEATH BY EXIDE ENGINEERS TO LEARN SECRETS OF LONGER LIFE

SINCE 1910, RESEARCHERS HAVE GREATLY IMPROVED EXIDE-IRONCLAD PERFORMANCE AND USEFUL WORKING LIFE, BUT THE BASIC IRONCLAD PRINCIPLE OF TUBULAR CONSTRUCTION REMAINS THE SAME.



LAB TESTS OF IRONCLADS AGAINST CONVENTIONAL TYPES OF BATTERIES SHOW THAT THEY GIVE BETTER PERFORMANCE... AND FROM 20% TO 30% LONGER LIFE! THESE TWO FACTS, DEMONSTRATED BY THOUSANDS OF BATTERY USERS, ARE THE REASON WHY...

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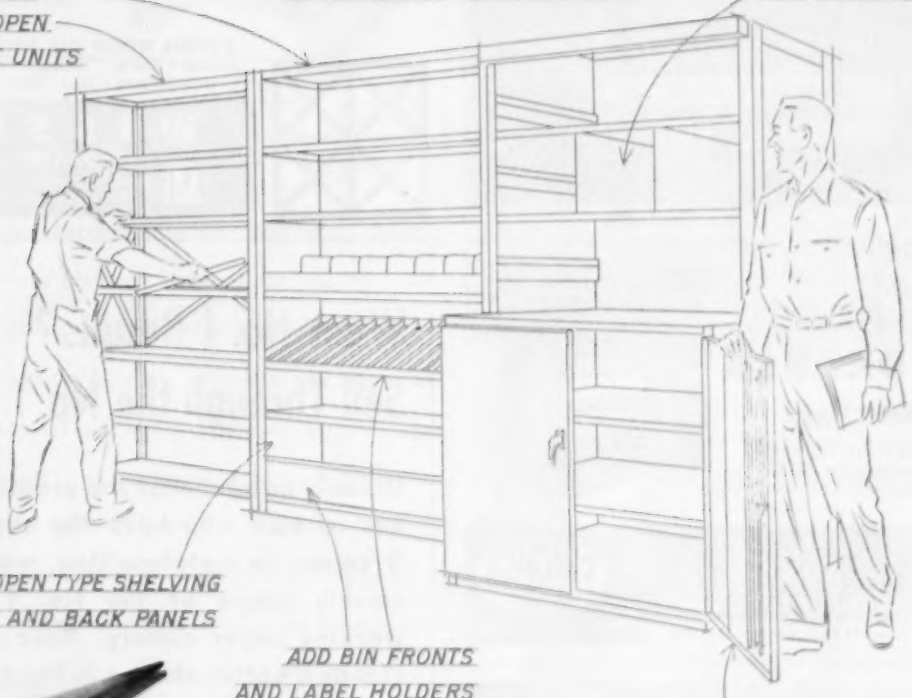
Exide INDUSTRIAL DIVISION, The Electric Storage Battery Company, Philadelphia 2, Pa.

HOW TO USE HALLOWELL ADJUSTABLE SHELVING IN PLANT MODERNIZATION

CHOOSE CLOSED OR OPEN TYPE UNITS

SET THEM UP INDIVIDUALLY— OR COMBINED AS REQUIRED

ADD DIVIDERS



CONVERT OPEN TYPE SHELVING WITH SIDE AND BACK PANELS

ADD BIN FRONTS AND LABEL HOLDERS AS NEEDED

ADD SWINGING OR SLIDING DOORS TO CLOSED TYPE UNITS

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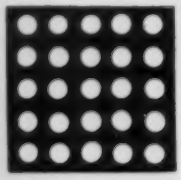

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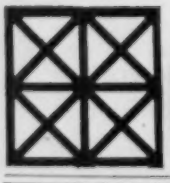

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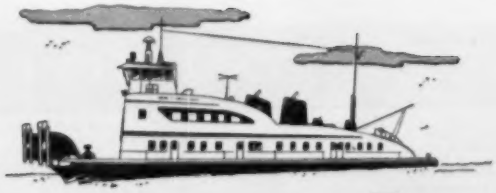

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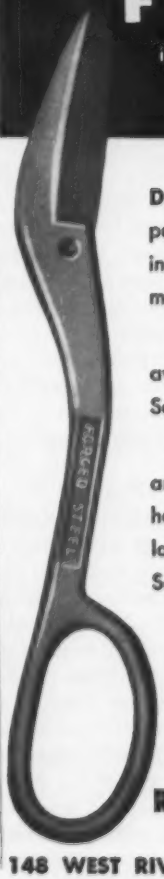

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THE CLEARING HOUSE

News of Used and Rebuilt Machinery

Chicago Sales Strong . . . With April and May showing good sales levels, and with some firms reporting May as their best month of the year thus far, there were none the less, some trouble spots developing in the Midwest last week. The small dealers have often been the first to feel a change in the customer attitude and small dealers were reporting a drag in sales during the latter part of May that seems to be carrying over into June.

If the trend continues, the summer slump will arrive about 1 month earlier than had been expected at the end of first quarter, when many were confident that the rising sales volume of first quarter would continue all the way through to beginning of July.

Small Houses Complain . . . It's notable, however, that it is the smaller tool houses which are registering the strongest complaint thus far. Many of these shops carry other lines than used machine tools.

Their affect on the total used machine tool market in the Midwest isn't as great as their numbers would indicate. It is pretty positive that slackening or no, the used tool industry in the Midwest will continue through the remainder of June at a pace 10-25 pct over levels during the same period 1 year ago.

Heavy Units Move . . . Sheet metal equipment, jig borers, milling equipment, radial drills, turret and automatic lathes are all continuing in excellent demand. Heavy equipment of this type is bound to hold dollar volume at a high level. Again, it is the smaller dealer who is struggling with a relatively high inventory of slightly older tool models who's having the trouble. New equipment at auction is still bringing a stiff price, and the active bidding by companies who are buying tools for their own use is making it tough for the dealer who needs to replenish his own inventories. Indicating two things: (1) consumer demand is still there, (2) there are no quantities of used tools floating on the market at low prices as would be the case if consumers suddenly decided to stop buying.

Sell Coast More . . . Firms doing business with the West Coast report some slackening in that area as well, but when pressed will affirm that sales are running well over last year at this time—and that if any weakness is developing in the used tool market, it's too early to call it anything more than the first indications of the normal seasonal slowdown.

A considerable amount of the pessimism, where it occurs, goes right back to inventory. "If you haven't got it, you can't sell it" is the war cry, and in many cases sales volume is dropping more because the dealer can't get his hands on the precise piece of equipment needed by the customer, than because the customer has gone out of the market.

Need Stock . . . Which boils down to the fact that even though their sales volume is off, many smaller shops would like to rebuild inventories and are torn between paying current auction prices, and letting their inventories sink even further after the drain imposed in March, April, and most of May.

Rebuilding is continuing at good levels with backlogs of work holding.

June inquiries are off, and it is generally acknowledged that July will see a drop. It always has. But May has been good and the alarm felt by some houses doesn't seem to be justified by the actual going level of machine tool sales. The dollar volume is very good. Buyers are choosy but active.

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BRAKES—PRESS TYPE
12' All Steel Press Brake, 250 ton Capacity

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5 ton P&H Trav-Lift	29' Span	220/440 A.C.
5 ton Northern	57' Span	220/3/60 A.C.
5 ton Toledo	60' Span	230 Volt D.C.
5 ton Cleveland	96' Span	230 Volt D.C.
7½ ton Shepard-Niles	23' Span	220/3/60 A.C.
10 ton P&H	35' Span	230 Volt D.C.
10 ton Shaw	72' Span	230 Volt D.C.
10 ton Northern	75' Span	230 Volt D.C.
15 ton Shaw	72' Span	230 Volt D.C.
25 ton P&H With 5 ton Auxiliary	60' Span	230 Volt D.C.
30 ton Whiting	60' Span	230 Volt D.C.
50 ton Niles	60' Span	230/3/60 A.C.
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PRESSES—INCLINABLE
#6½A Niagara, 150 ton, 13" Stroke
Cleveland, 125 ton, 12" Stroke

PRESSES—STRAIGHT SIDE
#304 Bliss, 8" Stroke
#308 Bliss, 255 ton, 14" Stroke
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Cleveland Style IX Beam Punch & Coping Machine Punch standard I-beams and channels in web and flange from 7" to 24", Bethlehem I-beams and girders 6" to 20". Motor Dr. with AC Motor

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Model A33 Reed Thread Roller, Horizontal, Capacity Approx. Work Dia. In-feed, Standard Equip. 1" to 4"

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Syncro BCB Wire Drawing Machine 14 Die, Motor Drive, Spooler and Blocks Incl. Max. capacity entering .165", finish min. .0104" low carbon steel

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1	800	G.E.	MT	2300	300
1	700	A.C.		2300	500
1	500	G.E.	M-574Y	6900	900
1	500	G.E.	MT-413	2300	580
1	500	Whse.	CW	550	350
1	400	Whse.	CW-986A	440	1170
1	400	Whse.	CW	440	514
1	400	Whse.	CW-1215	2200	435
1	350	G.E.	MT-441Y	2300/4000	253
2	350	G.E.	IM-17A	440/2200	720
1	250	G.E.	MT-424Y	4000	257
1	250	G.E.	MT-559B	2200	1800
1	250	Al. Ch.		550	600
1	200	Cr. Wh.	26QB	440	505
1	200	G.E.	IM	440	435
1	135 (unused)	Whse.	CW	2300	435
2	125	A.C.		440	865
1	125	Al. Ch.		440	720
1	100	G.E.	IM-16	2200	435
1	100	G.E.	IM	440	600
4	100	A.C.	ANY	440	695

SQUIRREL CAGE

2	650	G.E.	FT-559BY	440	3570
1	500	G.E.	K-6345-B	2200	1185
2	450	Whse.	CR-1439	2300/4150	374
1	400	G.E.	IE-15B	2200	1165
1	400	G.E.	IK	2200	580
1	200	G.E.	IK-17	440	580
3	200	G.E.	KT-557	440	1800
1	150/75	G.E.	IK	440	900/450
1	150	Whse.	CR-8568	440	880
1	150	Whse.	CR	440	580
2	125	Al. Ch.	ARW	2200	1750
1	100	Whse.	CR-876C-TEFC	440	710

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1	4250	C.W.	3501-SL	13800/6900	514
2	2100	G.E.	ATI	2300	360
3	2000	Whse.		2300	120
2	1750	G.E.	ATI	2300	3600
3	725	G.E.	ATI	2300/12000	600
1	500	Ideal	9M	2300/4160	1200
3	500	G.E.	TS-7547	2200	1200
1	450	Whse.		2200	138.5
1	450	Whse.		2200	450
1	400	G.E.	TS-7565	2300	1200
1	400	G.E.	TS	2200	400

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16" x 96" Landis gap type cylindrical, new 1941.

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200 ton No. 7C Bliss S.S., D.C.
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300 ton No. 1039 Hamilton D.C., adj. bed. 60" x 102".
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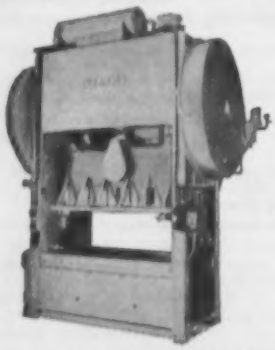

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400	Al.-Ch.	2300	120/240
200	G.E.	2300	250/275
200	Westg.	4160/2200	275
200	Ridgeway	2300	250
170	G.E.	440	125
150	G.E.	2300	125/250
150	Al.-Ch.	2300	275
150	Westg.	2300	125/250
150	G.E.	440	275
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100	Westg.	440	125
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1	1000	G.E.	600	600	2300
1	1000	Whse.	514	600	11,000/6600
1	500	C.W.	720	575/600	2300/440
4	500	Whse.	1200	125/250	2300
1	450	C.W.	720	250	2300/440
1	450	C.W.	1200	125/250	2300/440
2	250	G.E.	600	125/250	2300
1	200	Whse.	1200	600	2300/440
1	150	G.E.	720	250	2300/440
1	100	Whse.	900	250	2300
1	100	C.W.	1200	125	440/220
1	100	Whse.	1200	250	4160

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1	2000	Whse.	Mill	600	230/460
4	1140	Whse.	Encl.	525	600
1	1200	G.E.	MCF-6	660	350/700
1	800	Whse.	Encl.	525	660
1	800	Whse.	Mill	500	250/550
1	700	Whse.	Encl.	250	300/700
2	500	Whse.	Mill	250	325/715
1	400	G.E.	CD-100-A	230	1150
1	350	G.E.	MPC	600	525/975
1	300	G.E.	MCF	600	300/685
1	300/350	W. Dy.	#23	230	400/1200
1	250	Whse.	Mill	250	300/1200
1	200	G.E.	MDP-430	250	250/610
1	150	G.E.	MPC	250	600
1	150	Whse.	RK-201	230	300/900
3	135	Whse.	RK-184	230	575/850
1	125	Whse.	RK-190	600	600
1	125	G.E.	MPC-6	230	600/900
1	90/160	G.E.	MPC	250	625/1125
4	100	W. Dy.	S-50	250	450/1350
9	75	C.W.	M-II	250	900
1	75	Cont.	D147X	250	435/1275
1	60	Whse.	RK-181.5	230	600/2300
1	60	Whse.	RK-140	230	500/1700
1	60	G.E.	CD-130	250	500/1000
1	55	Whse.	RK	230	250/1000
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1—35-ton Northern, 5-ton aux., 75'0" span, 220/-3/60 cy. cab.
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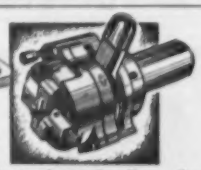

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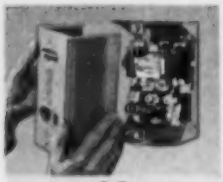
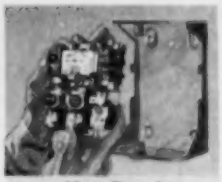
MOTOR CONTROL
C-H



3-D Accessibility

Removing the wrap-around cover bares the entire starter for three-directional accessibility. It is wide open at front and both sides. You can see everything and reach anything. Wiring the starter is simplified and routine inspection is made so easy and complete nothing is ever neglected.



Unit Panel Construction

The entire starter mechanism can be removed from its case by simply loosening three screws. With mechanism out of the way, mounting case, connecting conduit and pulling wires is a cinch. A great time saver. No skinned knuckles. No damaged starter mechanisms.

Full Three-Phase Protection

Only *three* overload relays can provide positive three-phase protection to stop needless motor burn-outs and production interruptions. And only Cutler-Hammer offers three overload relays in *standard* starters without the excessive costs and delays of special starter constructions.

Adjustable Sensing Coils

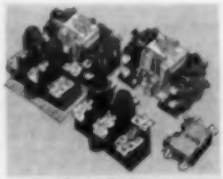
Only the accurate adjustment of overload protection permits motors to work harder without damage. Now more important than ever with newer type small frame motors. Only C-H offers adjustable load sensing coils . . . for 3% loading accuracy instead of the 10% to 12% in all other controls.

Superlife Vertical Contacts

Now the famous C-H dust-safe vertical contacts have been doubly improved. New light-weight design cuts bounce to reduce arcing. Also, arcing is now pressure-quenched. Contact maintenance care and costs are ended for all time in all normal motor control uses.

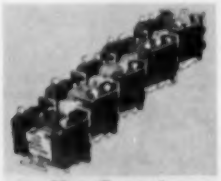
For Control Panel Designers

The new Cutler-Hammer ★★★ Motor Control offers an array of spectacular new features to provide many exclusive advantages in circuit planning, compact panel design, better motor protection and better control performance. Be sure you have complete design data on this advanced equipment. Write or wire today.



New Control Components

All parts of the new C-H ★★★ Starters in NEMA 0, 1 and 2 Sizes are available as components; also complete starters on convenient unit panels. Electrical interlocks are available to provide additional control circuits when desired.



New Control Relays

Finest of control relays. 10 and 15 Amp. 2-3-4-5-6 poles. All contacts instantly convertible from NO to NC or vice versa. NO or NC status seen at a glance without removing cover. New armored magnet coils color coded for voltage and frequency.

New SD & HD Pushbuttons

New standard duty pushbutton station with pilot light offers many exclusive features, typical of complete C-H line. Watch soon for announcement of the revolutionary new line of C-H heavy-duty oil-tight one-hole mounting pushbuttons.